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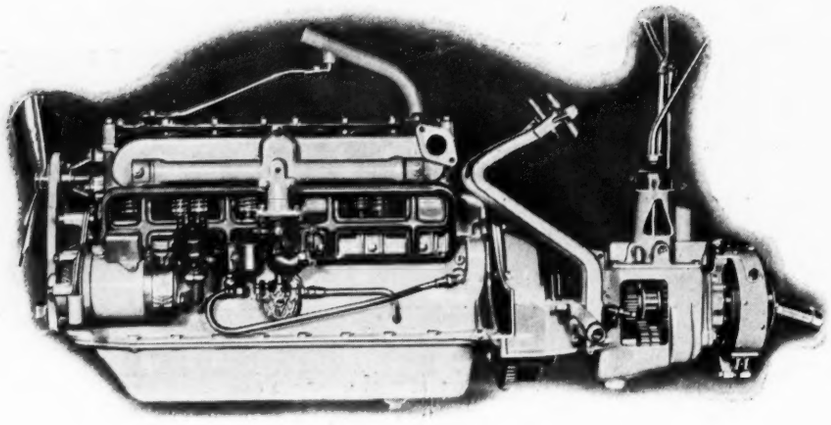

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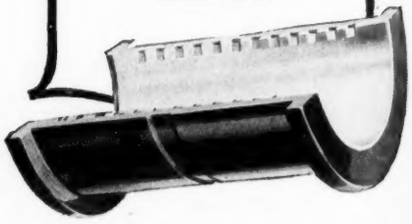

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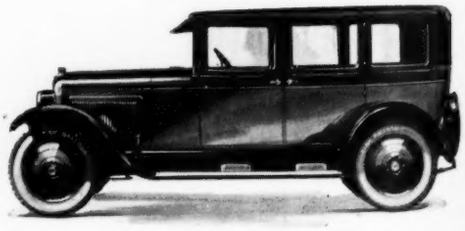

The new Willys-Overland Sedan on the 6-Cylinder chassis. Federal-Mogul Close Limit Interchangeable Bearings are used on both four and six cylinder models of the Willys-Overland.

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AUTOMOTIVE INDUSTRIES

VOL. 52 NEW YORK—THURSDAY, MARCH 12, 1925 NO. 11

1924 Income Statements Show Profits Don't Follow Production Line

With supply exceeding demand, increases in output alone no longer open a royal road to greater dividends. New conditions demand economy in all departments.

By Norman G. Shidle

IN this article actual figures are drawn upon to prove the contention that profits in the automotive industry can no longer be forced up merely by getting increased production.

The cost of making sales beyond a certain volume is all out of proportion to any reduction in factory overhead gained by increased output.

As the following facts show, some of the manufacturers who did build and sell materially more cars in 1924 than in 1923, ended the year with relatively little gain in the way of net profits to repay them for their extra worry and work.

The saving per unit in production costs was obviously wiped out by increased marketing costs.

WE have just finished analyzing the statements of a number of important passenger car companies.

Comparison of profits and production for the years 1923 and 1924 in a majority of cases bears out the statement that increased volume alone is not a royal road to increased profits.

In several cases the point is illustrated with particular emphasis.

> Several companies studied showed a production increase of 50 to 55 per cent while profits went up only 1 to 10 per cent during the year.

In one sense these producers were exceptional, in that few companies had as large an output in 1924 as in 1923, the general trend of sales being downward. Other cases which confirm the point had production decreases, but their profits didn't fall nearly so much as did their output. Among the records are the following:

> Company A fell off a little over 7 per cent in production, but actually made a small gain in profits as compared with 1923.
>
> Company B had a production decline of 22 per cent, but a falling off in profits of only 15 cent.
>
> On the border line was Company C, whose output and profits both decreased about 25 per cent.

In only a few cases was the decline in profits greater than the decline in production, and in none of these was the difference in percentage large. The records showed, for example:

> In one case profits declined 39 per cent as against a production drop of 35 per cent.
>
> In another, profits declined 32 per cent as against a production decrease of about 21 per cent.

It is recognized, of course, that factors other than profits from car sales influence the final figure for net profits, and that the net profit figure does not tell the whole financial story. In the case of such organizations as General Motors and Ford, the influence of these other items probably is so great as to make unreasonable any direct comparison of car output with net profits.

The chief business of all the organizations considered here, however, is that of building and selling passenger cars. While profits from the sale of parts and from various investments enter the net profit figure, they do not influence it sufficiently to make improper a direct comparison with production fluctuations.

The examples taken, moreover, cover every price range except the lowest and include large as well as small producers. The smallest producer included makes about 2000 to 3000 vehicles a year, while the two largest each build in excess of 100,000 a year.

Developing Future Policies

As more profit and loss statements become available, it will be interesting to trace the relations between net profits and production. From such a study may be developed a fair idea of the policies in regard to future merchandising and production which are gaining favor in different organizations.

So long as demand for automobiles exceeded supply, it was obvious that increased production meant decreased overhead. That economic law worked practically without hindrance throughout the period of rapid growth in the automotive field.

But all the time it was dependent upon a more basic law—that of supply and demand. The "increased production and decreased overhead law" worked without fail for so long in the automotive field that a lot of people forgot that it was a supplementary and not a fundamental law.

When supply caught up with demand, sales resistance grew and marketing costs increased as a natural result. Then another supplementary law, always existing, of course, but previously dormant, began active operations. The law said "Increased production—which is increased supply—increases competition and consequently increases selling costs."

From that time on the operation of the "increased selling costs" law offset to a large extent the "decreased overhead" law. It became necessary, in order to guide company policy aright, to think of both laws at the same time when planning production and sales schedules.

The "decreased overhead" idea had been functioning actively by itself for so long, however, that it naturally held the place of honor in the minds of many executives. The "increased sales cost" idea began to get a much better hearing after the sad production experiences of the early part of 1924.

Tendency Toward Broader Vision

Today there is a greater tendency than ever before to view the economics of automotive production and selling from a broad, thorough viewpoint.

It is pretty well recognized that production economies no longer can be expected to absorb sales wastes. Future savings in the shop will be needed to meet price competition and always will be a big factor in net profits. But net profits in the future will result only when efficiency of operation is common to every department of the business.

Sometimes a base ball team finds it possible to win a pennant without a thoroughly competent pitching staff. It may be blessed with an aggregation of Babe Ruths who can lace the cover off the ball every time they come to bat. By piling up an average of 10 or 12 runs a game such a team may be able to come through with reasonable success, despite the weakness of its hurlers.

But that isn't the way most pennants are won. It takes a good all-round team to stay in the first division year after year. Sluggers always are welcome on any team, but the best managers have come to consider their efforts as "velvet." They know that they need nine good all-round men on the field to get the best results and that when competition is keen strength in one department isn't enough to win.

The automotive race is tightening up. Companies which have been in the first division for many years are finding it necessary to strengthen various departments in order to maintain the position which they have held previously. New contenders, well equipped both in the infield and the outfield, have come forward eager for the fray and some of them bid fair to make the leaders stop. And the contest among the leaders themselves is growing keener each year.

What does all this mean to the individual car maker?

For one thing, it means that future plans must be laid with full recognition of the fundamental economic laws which are operating in the automotive business.

The *rate of growth* of automotive sales has slowed down. Actual sales will increase again in the future without doubt, but the period of rapid growth has passed.

Every company, however strong and however efficient, must trim its sails to meet this general condition.

Many close students of the industry have voiced the following opinion in recent months:

"The company which sets its price and rests its expectation of profit solely on the chance of greatly increased production is playing a risky game. It may win several temporary victories, but its chances for success in the long run are hazardous.

"Competitors are almost certain to meet its price reductions, so that after all is said and done the net result probably would be stabilization of all prices on a lower level; which would mean a narrower margin of profit and no change in the relative position of the organizations involved. Consequently, it seems necessary in the future to plan prices and policies with a view to making profits without expanding rapidly output schedules."

Time Alone Will Tell

How true that opinion is, time alone will tell. Certainly it is in accord with reason, based on analysis of the facts now at hand.

The immediate situation, as summarized by the United Business Service, is that sales expansion this spring will be a moderate and orderly affair, but that increased business is general throughout the country. Then comes the caution:

"We warn executives, however, that this larger volume may or may not mean increased profits, depending on competitive price levels, internal costs and individual administrative policies."

For several weeks to come, nearly every day will bring forth a detailed financial report from one or more automotive concerns. The monetary records for 1924 of a number of passenger car companies already have been made public and the Wall Street statisticians are busy trying to determine just what each one really means.

The annual statement always gets close attention from the financially minded men both in and out of the company to which the figures refer. But it ought to get closer study in the future from the sales manager, the engineer and the production manager as well.

Few people except trained accountants can be expected to understand thoroughly every detail of the average financial statement. But anybody can understand fairly well what is meant by "net profits"—and after all net profit is the goal for which every man in every factory is working.

If net profits aren't satisfactory something is wrong.

(*Continued on page* 509)

Offset Powerplant of Gotfredson Bus Increases Aisle Space

Differential housing of rear axle placed near left spring pad. Chassis has 208 in. wheelbase and weighs 6000 lbs. Buda engine and four-wheel air brakes used.

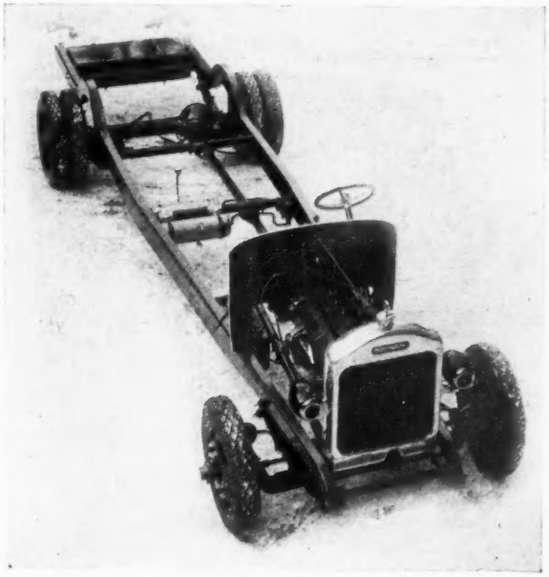


Fig. 1—Perspective of new Gotfredson bus chassis showing offset arrangement of all mechanical units and the Westinghouse air brake system

Fig. 3—Head-on view showing front wheel brake assembly with air chambers attached to brake carriers at the axle

LOW floor and overall heights, combined with a clear level aisle from end to end, are made possible by the offset powerplant arrangement of the new Gotfredson 21-29 passenger bus chassis. The differential pot of the cast steel worm-driven rear axle is located next to the left spring pad so that no obstruction is raised at the center aisle position. Therefore a symmetrical seating arrangement and an aisle with no obstructions are possible.

Due to this arrangement of the rear end, the entire powerplant is located well to the left of the center of the chassis, bringing about the advantage of greater room at the front door than the usual type of pay-enter urban buses.

In addition to this novel feature, the new chassis is equipped with a six-cylinder Buda engine, Brown-Lipe four-speed transmission, Ross cam and lever steering gear, Westinghouse air brakes at all four wheels and Edmunds & Jones Type 20 headlamps. The special rear axle is manufactured by Gotfredson.

For the 21-29 passenger bodies of the coach, or pay-enter types, the wheelbase is 208 in., and a six-cylinder 4 in. bore x 5⅛ in. stroke engine is specified. The Gotfredson Truck Corp. also plans to build a similar chassis of 230 in. wheelbase with a 4½ x 6 Buda engine for double-deck service.

The smaller chassis, which is the subject of this description, weighs 6000 lb. and has a wide tread at both front and rear axles. Budd disk wheels and 32 x 6 truck cord tires are standard equipment all around. Dual tires are standard at the rear axle. The price on the chassis has not been set and it is not intended to furnish standard bodies, although the same company will build and paint bodies in accordance with the customer's order.

Fig. 1 illustrates the offset location of all of the units of the powerplant and also shows the tubular cross members which are used at every point with the exception of the front engine support. All of these cross pieces are drawn steel tubing of 3 in. diameter and ¼ in. wall thickness and are fitted at each end with cast steel flanges which are riveted to the side members. One tubular cross member is located at the front spring horns, another is placed just back of the gearbox, a third carries the intermediate bearing of the jointed propeller shaft, a fourth is located somewhat ahead of the rear axle and carries the pipe terminals for the rear air brake system, and a fifth is placed back of the axle and acts as part of the cradle for the gas tank.

Side Members Are Tapered

Side members are made of ¼ in. thick stock and are 8⅝ in. deep at mid-length, tapering to 6 in. depth at the rear and blending into the spring horns at the front end. The maximum width of the upper and lower flanges is 3¼ in. At the rear end the side members are parallel. They are tapered from a point somewhat back of the middle of the wheelbase to the front horns to facilitate short turning. With the exception of the kick-up over the rear axle the top flange or body mounting surface is flat and in one plane.

A trunnion on the timing gear case is carried in a

bracket on the front engine support and at the bell housing. One support is at a bracket in the left cross member and the other rests on a longitudinal tube which joins the second and third cross tubes. This longitudinal tube and the right cross member also acts as the support for the cradle in which the Exide No. 6 LXRE-13-1 battery is carried, the location being just back of the dash.

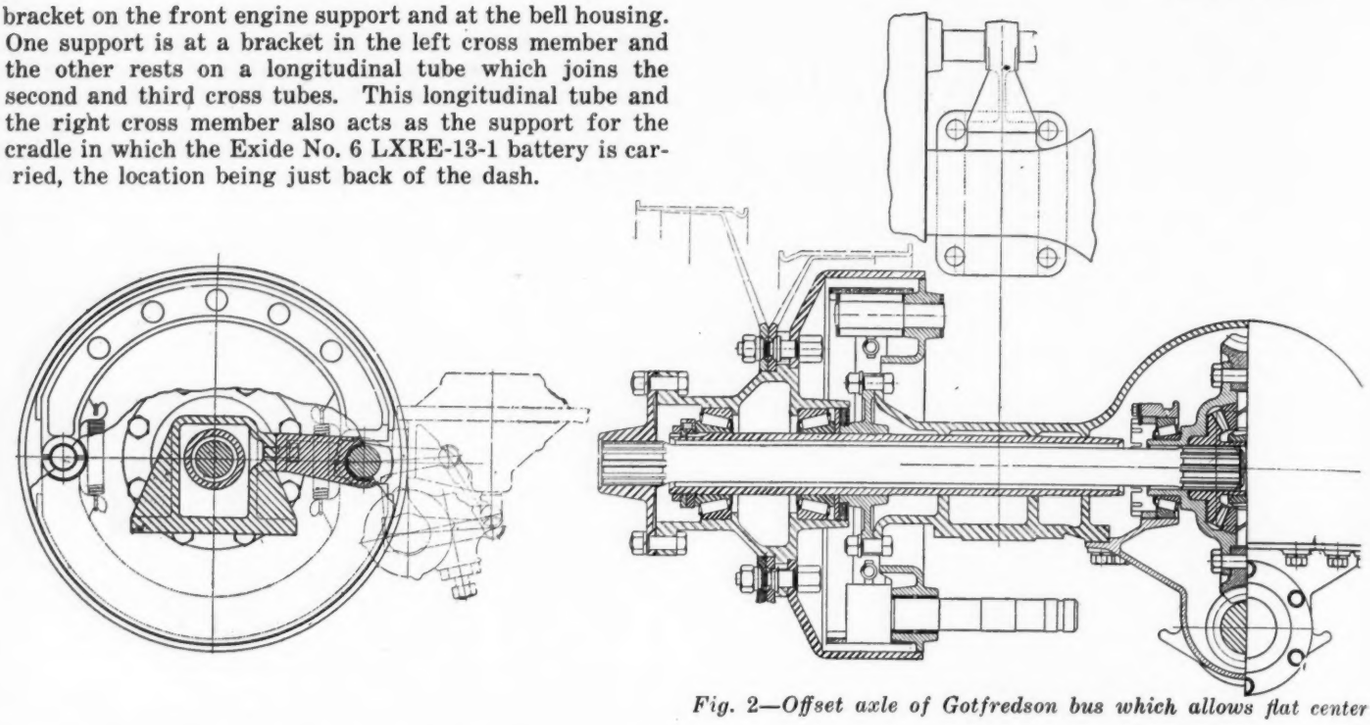


Fig. 2—Offset axle of Gotfredson bus which allows flat center

Motive power is supplied by the Buda BUS engine which has been discussed previously in these columns. This is an L-head four-bearing engine designed specifically for bus service. All main bearings are 2½ in. diameter. The first three are 2⅛ in. long and the flywheel bearing is 3½ in. long. The rod bearings have the same diameter and are 2½ in. long. The cam shaft is driven from the crankshaft pinion, the gears being helical with a face of 1¼ in. The camshaft gear drives the generator pinion, while an idler is interposed between the pump shaft gear and the cam gear. A gear type oil pump supplies oil under pressure to the main and camshaft bearings and drilled leads in the crankshaft cheeks take care of the lower rod bearings.

Mushroom tappets actuate the large diameter alloy valves, which are closed by long barrel-type springs, the latter being secured by split wedge and cup retainers. Three sectional covers enclose the valve springs and facilitate tappet adjustment. Cast iron pistons have three concentric rings above the pins and wiper rings below. Piston pins are locked in the pistons by conical lock screws and are retained endwise by snap rings. A phosphor bronze bushing is pressed in at the upper end of the connecting rod, while a two-bolt cap secures the bronze-backed, babbitt-lined split bearing at the lower end.

Cylinders Cast En Bloc

Cylinders are cast en bloc and bolted to the aluminum alloy crankcase, which is split horizontally 3½ in. below the crankshaft center line. The upper half of the bell housing is cast with the crankcase and the lower is part of the aluminum alloy pan. The drain cock in the pan is operated by hand lever which is located above the dust pan, eliminating the necessity for crawling under the chassis to perform this operation. The cylinder head is split off at the top of the piston head travel and, like the timing gear cover, is made of cast iron.

Separate intake and exhaust manifolds of cast iron are used, the former carrying a Zenith vertical carbureter which is fitted with a United air cleaner. The air compressor for the Westinghouse braking system is driven by a V-belt from the water pump shaft. Robert Bosch magneto ignition is used and North East 12-volt starting and lighting equipment is standard. A rubber V-belt drives the fan from a pulley at the front end of the water pump shaft. A fin and tube radiator enclosed in a polished cast aluminum housing completes the cooling system.

Brown-Lipe Clutch

Both clutch and gearset are made by Brown-Lipe, the former being multiple disk with 13 sets of plates. All gears in the gearset are ⅞ in. face of 5-7 pitch. Both upper and lower shafts are mounted in Gurney ball bearings and the spigot bearing at the back end of the clutch shaft is a Hyatt. The gearset is mounted as a unit with the engine, with the control set carried on the gearset cover. The hand brake operates an external contracting brake at the back of the gearcase. The drum is 13 3/16 in. diameter with a face of 4¼ in. The spokes of the drum wheel are arranged in fan fashion to assist in cooling the braking surface.

Three Spicer universal joints are used in the jointed propeller shaft construction. A Skayef self-aligning bearing mounted in a housing which is suspended from the intermediate cross tube supports the intermediate joint. As illustrated by Fig. 2, the three-quarter floating rear axle is a rather novel construction. The worm and springs are under-mounted on the dead axle, which is a cast steel unit fitted with reinforcing tubes of drawn steel. Two-row Skayef bearings carry the radial load at the worm shaft, while thrust is carried by a two-direction bearing of the same make. The differential and wheel bearings are made by Gilliam. The differential is offset 14¼ in. from the center line of the chassis. Live axles are 1¾ in. in diameter and are fitted with ten splines at each end. The clearance under the worm housing is 6 in., with 32 in. tires and 8 in. with 36 in. tires.

Front springs are 3 in. wide and 42 in. long, having ten plates and a total thickness of 2.916 in. Spring bolts at the front end are 1 in. diameter and are mounted in bronze bushings. Rear springs are 3½ in. wide and 60 in. long, with 11 plates and 3.688 in. total thickness. Bronze bushings carry 1¼ in. spring bolts at this end. The front springs are mounted above the I-beam front axle, which has a deep drop. Steering knuckle pins are 1⅜ in. diameter and the load of the chassis is carried on ball thrust

bearings. As Budd disk wheels are standard equipment, the centers of the steering knuckle pins are well out and fall within the width of the tire.

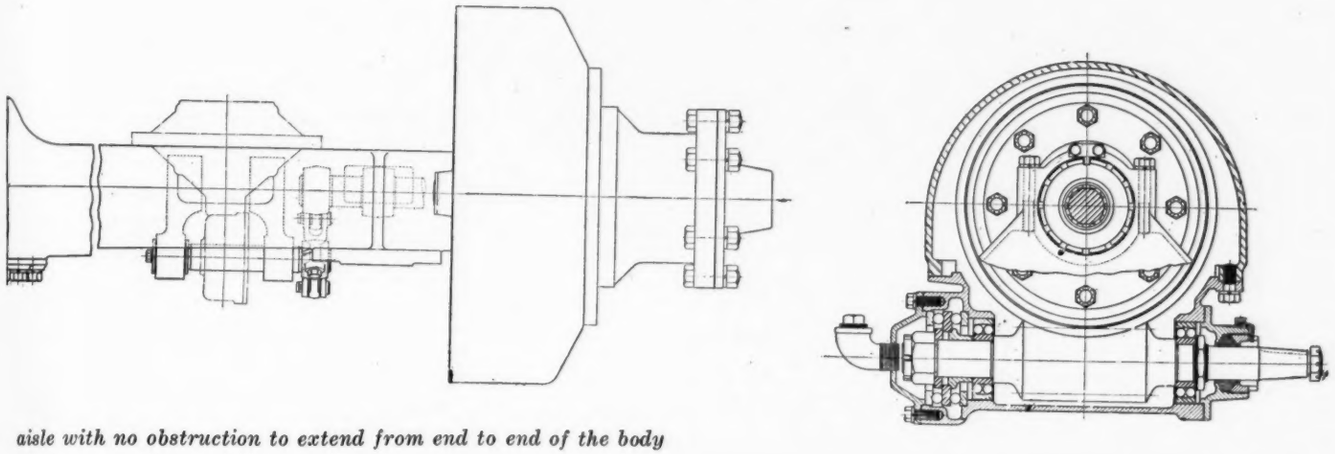
An unusual feature is the mounting of the Westinghouse brake diaphragm chambers on the brake carriers at the front axle (Fig. 3). This arrangement eliminates the usual linkage which is required to apply the brakes through the knuckle centers. A rubber hose connects the diaphragm chamber with the air line on the chassis. Front brakes are internal expanding shoes, the diameter of the drum being 17½ in. and the width 3 in. Control of the front wheels is by a Ross cam and lever steering gear which is connected to both wheels by large diameter tubing and improved ball ends. As in the rear axle, Gilliam taper roller bearings are used at the wheels.

Fuel is carried in a 33 gal. tank which is mounted just back of the rear tubular cross member. A vacuum tank on the dash is connected to both the carbureter and supply tank by Titeflex metal tubing. Similar tubing is used for the oil gage connection at the dash. Alemite connections are placed at every lubricating point on the chassis.

The air pressure reservoirs are mounted laterally on the center cross member, being carried well up between the side members to avoid interference when crossing high railway beds and similar obstructions in highway service.

On the rear axle, expanding brakes are also used. The diameter is the same as for the front axle, but the width is increased to 4 in. The diaphragm chambers are mounted on brackets inside of the springs and the braking effort is transmitted to the cams by intermediate shafts and levers.

Just when the larger Gotfredson bus chassis is to make its appearance has not been announced.



aisle with no obstruction to extend from end to end of the body

Gotfredson Now Building Taxicab in Canada

Designed primarily for sale in Canadian and export fields. Bell-Back body on 111 in. wheelbase seats five passengers.

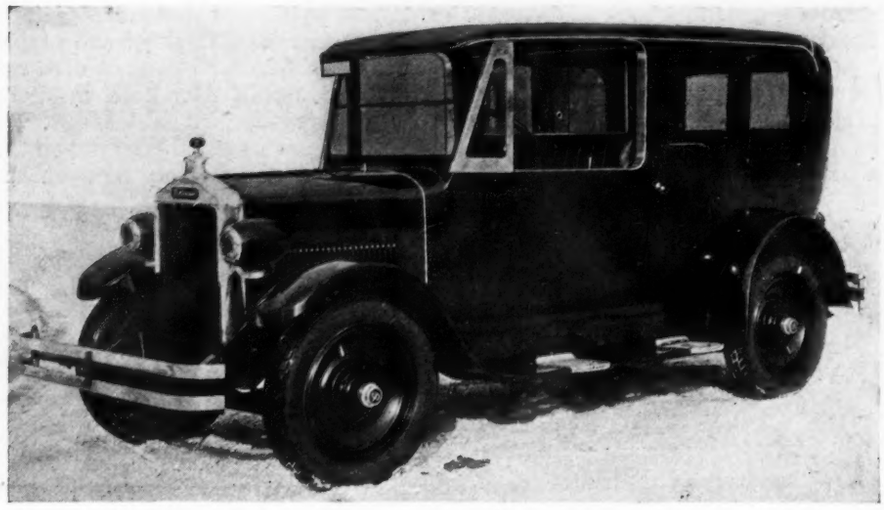
A COMPLETELY equipped taxicab is under production now at the Walkerville, Canada, plant of the Gotfredson Truck, Ltd., being intended primarily for sale and use in that country and in the export field. Bodies are designed to carry five passengers in addition to the driver, the enclosed portion having the usual three-passenger seat across the rear and two folding seats in the forward partition.

Although the wheelbase of the chassis is 111 in. an unusual amount of room is afforded as the body design includes a sloping front and bell back. Total weight of the complete vehicle is 4400 lbs. and the chassis alone weighs 3200 lbs. These figures indicate that the strenuous demands of taxicab service have dictated unusually heavy construction at every point. Fenders and running boards are heavy stamped steel.

The distinctive appearance which is characteristic of Gotfredson vehicles is maintained by the cast aluminum radiator shell and windshield frame, which includes glass corner panes. Half doors are hung at each side of the driver's compartment and all edges here are bound by heavy aluminum moulding. Edmunds and Jones type-20 headlamps, which are standard on the new Gotfredson buses, are regular equipment on the taxicabs. The color schemes of the bodies are made to suit the demands of the individual customer, although Duco is the standard finish of the body proper. Baked black enamel is the regular finish for the visible portions of the understructure.

Bodies are equipped with a fare register, electrically lighted "vacant" sign and exhaust heating system. The lower plane of the plate glass windshield is stationary while the upper is mounted on a piano hinge at the top. Scuff plates are placed at the bottoms of the doors. All seats are trimmed in hand buffed leather. A tool box is located under the driver's seat. A Stewart Warner speedometer, electric horn and spare wheel, rim and tire also are included in the regular equipment. In addition to the usual tools, an Alemite gun is included, as connections for this system are installed on the chassis. The price of the complete vehicle in Canada is $3,500.

Liberal use of tubular cross members insures rigidity of the frame structure. Tubes join the spring horns at each end and two tubes of 2 in. diameter and ¼ in. wall thickness are used amidships. In addition to these, three heavy pressed steel channels with liberal gussets at both ends tie the side rails together. Quarter inch stock is used



The new Gotfredson taxicab

for the side members and the depth at the center is 6 in. These members are parallel for a considerable length at the rear end but at a point just ahead of the kick-up over the rear axle they begin to taper and are again parallel with a much smaller over all width at the front end.

Half eliptical springs are used all around, the front springs being 2¼ in. wide and 39 in. long while those at the rear are 56 in. long and of the same width. Ten leaves are used at the front and eleven at the rear. All spring bolts are interchangeable and are fitted with bronze bushings. At the front end, a Salisbury I-beam, Elliot type axle is used and at the rear, a Clark axle has a reduction of 5 to 1. Ball bearings are used in the straddle mounting of the bevel pinion shaft with Timken roller bearings at the wheels. Service brakes are installed at the rear wheels, being internal expanding shoes which engage with drums of 15½ in. dia. and 3 in. face. Steering at the front end is accomplished by a Gemmer semi-irreversible worm and sector gear.

Light alloy pistons are used in the otherwise standard Buda 4 cylinder engine of 3¾ in. bore and 5⅛ in. stroke. With a piston displacement of 226.4 cu. in. this engine develops 37 hp. at 1800 r.p.m. Ignition is by Robert Bosch magneto equipped with automatic advance at the distributor. Remy equipment is installed for starting and lighting, in conjunction with an Exide storage battery which has 13 plates. A United air cleaner is fitted to the intake of the Zenith carbureter. The gasoline tank is mounted between the rear spring horns and fuel is fed by a Stewart Warner vacuum tank on the dash. Titeflex hose connections are used at both sides of the vacuum tank and for the oil gage line, eliminating the possibility of crystallization and leakage.

In a unit power plant construction, a Brown-Lipe three-speed and reverse gearbox is mounted on the back of the bell housing. All gears are hardened and have a face of ¾ in. and the main shaft is 1½ in. in diameter. A Borg & Beck 10 in. single plate clutch is mounted in the flywheel. The control set is mounted centrally and the hand lever controls the emergency brake, which is mounted on the rear end of the upper shaft of the gearbox. The drum is 8 in. in diameter and the width of the contracting band is 2¼ in. As a Hotchkiss drive is used, Spicer joints are installed at both ends of the tubular propeller shaft.

Disteel wheels are standard all around and the spare is carried on a T bracket which is mounted on the rear cross tube. Tires are 30 x 5.

New Edison Institute Will Study Headlight Evils

FURTHER progress in the campaign to reduce motor accidents in the United States by a correction of headlight evils is likely to grow out of experiments and tests which have been provided for as one of the features of the new Edison Lighting Institute, recently established at the Edison Lamp Works of the General Electric Company in Harrison, N. J.

In a talk which he gave at the institute on Feb. 24, when a special demonstration was arranged for representatives of the automobile press, L. C. Porter, commercial engineer of the General Electric Co., stated that of the automobile accidents which occurred during the past year 35 per cent happened at night and most of them were due to the fact that the cars involved had either too much or too little light, blinding other drivers by their glare or making it impossible for the driver to see people in the road.

Some of the earlier laws passed to prevent accidents due to glare were impracticable, Mr. Porter said. The subject was taken up by the Illuminating Engineering Society which, in conjunction with the S. A. E., made tests to determine how accidents due to glare and insufficient illumination could be prevented. The Illuminating Engineering Society drew up specifications defining the maximum intensity of illumination permissible in the upper left field and the minimum illumination directly ahead required for safe driving, the former being set at 800 apparent candle power and the latter at 7200 apparent candle power. The S. A. E. went one step further and recommended 25,000 candle power as the desirable intensity of illumination directly ahead of the car.

After the desirable illuminating characteristics had been determined the next step was to pass laws in the different states specifying the lighting equipment that cars must carry.

The motor vehicle administrators of ten Eastern states formed the Motor Vehicle Conference which aims at uniform motor vehicle laws, including lighting requirements. But in spite of the work done by the Illuminating Engineering Society, the S. A. E. and the Motor Vehicle Conference, we still suffer from glare and other defects of motor vehicle lighting. The Bureau of Standards recently inspected and tested the lighting equipment of 400 vehicles in use in Washington, D. C., and found that only 5.5 per cent of these had lighting equipment that was correct and in proper operating condition. On many of the cars either the lenses or the reflectors were so dirty that the amount of light was cut down inordinately, or the bulbs were out of focus or the lamps misdirected.

One room in the Institute is devoted to the demonstration of the effect of improper headlight focusing. Various forms of anti-glare devices are also demonstrated here.

Pacific Coast Dealers Lose Ground in Freight Rate Fight

Many of those originally involved in pressing of claims for lower rates and rebates withdraw after railroads present their side of case. Car owners are watching outcome.

By Harry H. Dunn

AUTOMOBILE dealers of San Francisco and Los Angeles to the number of about thirty presented their claims for reduction in freight rates, and for approximately $400,000 in reparations on freight charges previously collected by the railroads, before Examiner Flynn, of the Interstate Commerce Commission, in San Francisco, Feb. 25 to 28 inclusive. At the conclusion of the hearings announcement was made that they would be continued in Los Angeles, beginning March 10.

The complaint of the automobile dealers involved freight rates on automobiles moving from various points of origin in the East to California, and affected half a dozen railroads, all of which were represented by attorneys and rate and traffic experts. The claims of the dealers were handled by Charles Clifford, a rate expert of San Francisco, who is understood to have originated the idea of filing the claims.

So thoroughly did the railroads appear to refute the claims as presented by Mr. Clifford in behalf of the dealers that dealers representing six makes of cars withdrew entirely from the case immediately at the close of the hearing. Dealers in San Francisco for Nash, Buick, Peerless, Locomobile and Cadillac announced their withdrawals from the complaint, and dealers in Los Angeles for Dodge, Nash and Cadillac, and the Dodge and Cadillac dealers in Fresno made similar announcements. It was expected by these dealers that others would withdraw prior to the reopening of the hearings in Los Angeles.

Claimed Refunds Were Due

According to the complaint as filed before the Interstate Commerce Commission the dealers contended that refunds on automobile freight rates during the past two years are due them. Indications were that, should the claim before the commission prove valid each dealer would claim personal damages from the railroad or railroads by which cars had been shipped to him during this period. The dealers also argued, through Mr. Clifford, for a reduction in present rates.

Though not very clearly brought out at the hearing, the claim of the dealers seems to be built on three points:

First, that reductions have been made on parts rates in the past several years, which have not been applied to car rates.

Second, that a dealer should not be compelled to pay freight on dunnage, particularly on timber used for crating, bracing and similar purposes.

Third, that rates on goods for export routed through Pacific coast ports are much lower than they are on goods shipped to Pacific coast ports.

On these points the dealers not only asked for reparations on past freight charges already paid, amounting to nearly half a million dollars, but also sought a rate of $3.75 per hundred, instead of the present prevailing rate of $4.65 per hundred, applying to carload lots, with a minimum of 10,000 pounds.

So important did the National Automobile Chamber of Commerce consider this hearing that J. S. Marvin, assistant general manager and general traffic manager, went to San Francisco especially to attend it. The withdrawal of Don Lee, Cadillac dealer in San Francisco and Los Angeles, and dean of the automobile dealers on the coast, has had a large influence in leading many of the dealers to reconsider their action in filing this complaint. What might be considered ineffective presentation of the argument of the dealers also was a factor to this end.

One of the leading points brought out by the attorneys and rate experts for the railroads was that half the freight charge is paid by the warehouses that take in the automobiles. Under a decision of the Supreme Court of the United States, if any reparations are paid they will have to go to the parties who pay the freight. This point appeared not to have been taken into consideration by the dealers prior to the hearings. Originally this matter of freight was thought to have been between the manufacturers and the dealers only.

In reply to claims of too high rates, both past and present, the railroads showed that the rates are on a lower basis on automobiles to California than to any other section, being special commodity rates, and only a little higher than second class. In the northern States, east of the Mississippi River, these rates are 110 per cent of first class, in the southern States they are first class, while in States west of the Mississippi, other than those of the Pacific coast, the rates also are first class.

IT was brought out at the freight rate hearing in San Francisco that the Pacific Coast already enjoys lower rates on automobiles than other sections of the country.

It is difficult to see, therefore, how the coast dealers can expect to obtain any further reduction. As a matter of fact, one result of the present controversy may be an increase in rates, according to Mr. Dunn's appraisal.

Presentation of the automobile rate situation in this light rather knocked the bottom out of the arguments made on behalf of the complaint of the dealers. The railroads, however, continued with their evidence, showing that the minimum carload weight is 10,000 pounds on 40-foot cars, and 12,000 pounds on 50-foot cars for shipment to the Pacific coast, as compared with 11,200 pounds

on 40-foot cars and 16,400 pounds on 50-foot cars, to all other parts of the country.

A particular point made by the railroads was that California shipments cannot be handled in their own automobile cars, which are generally available at the factories, but must be handled in 50-foot cars, which have to be hauled empty to the factories, and likewise largely empty, back from California to points of origin in the East. The railroads' case, in brief, is that not only are the rates to the Pacific coast lower, but the expense of handling the cars is greater than to other sections of the country.

Automobile dealers were conspicuous by their absence from the witness stand, virtually all of the testimony being adduced from bookkeepers, cashiers, rate and shipping clerks and other employees of the dealers. L. W. Milburn, Hupmobile, and W. J. Benson, Flint, were the two leading dealers who testified.

Examiner Flynn, at the request of the attorneys for the railroads, quoted from the contracts the dealers have with the factories, resulting in a long and involved discussion of discounts and service allowances. The railroads quite apparently were seeking to establish the fact that the dealers habitually pass on the freight charge to the buyer of the car. Under cross-examination of witnesses this was generally admitted. In the background —though not as yet brought out at the hearing—loomed the idea that some dealers have been making a neat profit out of passing on the freight charges to the buyer of the automobile. Whether this would be developed at the Los Angeles hearing was problematical, but indications were that it will not be necessary. As a matter of fact, when Mr. Clifford announced that he had finished presenting testimony and exhibits, the attorneys and rate men for the railroads considered their case so far won that the majority of them left immediately for their eastern and middle-western headquarters.

Those dealers who have withdrawn from the complaint have come to consider—at least in some instances—that the freight rate is a matter between the railroads and the factories, that the dealer passes the freight on to the consumer, and, therefore, cannot be damaged personally, thus having no claim for reparation. They hold, still, that present freight rates are too high, but they believe that petition for reduction of prevailing rates should be made altogether separately from claims for reparations to which they quite frankly believe they are not entitled.

Here, too, the matter arises of passing such reparations as might be obtained, if any could be secured, back to the hundreds of thousands of buyers of automobiles who have paid this freight. This would be a serious and involved problem, and, quite possibly, would result in lawsuits costing more than the value of all the reparations obtained.

Might Lose Favorable Rates

There is also the intimation that a result of a decision in favor of the dealers would be the loss of the prevailing commodity rate on automobiles to California. Possibly there also would follow the loss of other favorable rates enjoyed on export shipments through Pacific coast ports. California, it should be said, is the only section to which cars are shipped in large quantities which enjoys this commodity rate, due to Panama Canal steamship competition, profits arising from the long, continuous hauls and similar factors.

Throughout California, and to some extent in Oregon and Washington, this hearing created even wider interest among automobile owners than among the dealers, of which latter only a comparative few joined in the complaint. Car owners, and particularly buyers of cars within the past two years, have developed the feeling that, in some manner, they had paid more freight than they should have paid. The point made by the railroads, that the dealers have collected, and are collecting, the full freight from the final car buyer, with the added intimation that something else was arbitrarily put on as pure profit, has led to an unpleasant feeling on the part of many owners of new cars.

Thus the complaint already has proved, in a way, a boomerang on some of the dealers, and there is a considerable possibility that car owners in many of the smaller communities—where most of the cars are sold—will endeavor to collect the difference between the full freight which they paid and their prorated share of the full-car freight, from the dealer involved, whether or not the dealers are able to collect their freight claim from the railroads. All of this has led to a general undercurrent of demand for the advertisement by the factories, of prices *delivered,* rather than f.o.b.

THERE is a possibility of an unpleasant aftermath to this action which the coast dealers have instigated against the railroads.

The railroads made veiled charges that the dealers have imposed on the public by tacking on more for freight than they paid. This has aroused resentment among car owners.

The railroads made several other interesting contentions, and methodically upheld them, using on some occasions the witnesses and the exhibits filed by the representative of the dealers. The carriers showed:

First, that reductions on parts rates were made because parts are shipped more easily through the Panama Canal, on account of facility of loading and carrying, and, therefore, reduction had to be made on these to enable the railroads to meet steamship competition.

Second, that reductions similar to those made on parts were not made on cars because of differing competitive conditions.

Third, that the railroads in the past have defeated dunnage, timbering, crating, bracing and other claims on several occasions, and that, therefore, these claims cannot be expected to hold now.

Fourth, that, for a variety of reasons, no comparison can be made between export rates and domestic rates, export cars being entirely crated, loaded on flat cars with a minimum of 15,000, instead of 10,000, pounds, and extreme dunnage due to weight of boxing, bracing, etc.

Fifth, that, as has been shown, rates to California on automobiles already are better than they are to other sections of the country.

Whatever the result of the continued hearing at Los Angeles, at which it is evident the dealers do not intend to present much, if any, new evidence, it will be several months before a decision is rendered. There seems to be a feeling among dealers in San Francisco—both those who did not join in the complaint and those who withdrew from it at the close of the hearing—that no matter what the decision of the Interstate Commerce Commission, two important results will come:

That contracts between the manufacturers and the dealers in the future will carry clauses binding the dealer to handle freight matters only with his factory; and,

That the end of f.o.b. prices is just over the hill, and that, very shortly, every bill of sale will show the freight rate as a distinct item, so that the buyer may have redress if he is overcharged.

Motor World to Become MOTOR WORLD WHOLESALE

MOTOR WORLD, beginning with the issue of May 28, will become MOTOR WORLD WHOLESALE. It will be published, as *Motor World* has been, by the Class Journal and Chilton companies, publishers of *Automotive Industries, Motor Age, Automobile Trade Journal*, and other automotive business papers.

MOTOR WORLD WHOLESALE, as the name suggests, will be devoted exclusively to the problems of wholesaling motor vehicles and all the products of the automotive industry. It will be published weekly and will be the same size as the present *Motor World*.

The character as a merchandising magazine that *Motor World* has built up during the past ten years will be broadened and changed to meet the needs of wholesaling. The general automotive jobber, car distributor, the replacement parts distributor, the specialty jobber, the tire wholesaler, the branch house, the manufacturers' agents—in short, all wholesalers in the automotive field will find MOTOR WORLD WHOLESALE a strong, constructive, virile news and merchandising business paper, just as *Motor World* has been in its field in the past.

THE change to MOTOR WORLD WHOLESALE has been a natural evolution dictated by the growth of the great industry it has served. A dozen years ago there were but 1,000,000 motor cars in the United States. The wholesale field and its problems were small as compared with today. The unprecedented growth of automotive distribution has brought the wholesale field into problems not dreamed of in the early days. Thus the need for MOTOR WORLD WHOLESALE has been created.

Salesmen of automotive wholesalers now visit 98,000 retail trade units once or twice a month, a great many of them once a week. It is a service without which it would be impossible for the manufacturer to economically and effectively place his product on sale in every hamlet, village, town and city in the country.

THE automotive wholesaler not only has distributed the products of the industry. He has been a dominant factor in the selling of them. He has created the machinery necessary for their distribution in small quantities to the thousands of small repair shops, garages, service stations and dealers and he has carried his burden in the financing of this distribution.

Automotive wholesaling has increased rapidly in scope in the last few years since car production has reached 3,000,000 or 4,000,000 a year. This unprecedented production has brought new types of wholesalers into the field. Some of their problems are general. Some of the problems are peculiar to individual groups.

And so, MOTOR WORLD WHOLESALE will be a departmentized business paper.

IT will contain up-to-the-minute news of the industry and report and interpret general business trends. It will contain general business and automotive market reports especially prepared for the wholesaler. It will publish each week strong articles by recognized business authorities and economists and method stories by wholesale authorities.

And in addition to these features it will carry specific departments devoted to the problems of individual groups of wholesalers.

The last two years have demonstrated that the automotive dealer, especially outside the areas of intense merchandising specialization, is an important factor in the sale of radio. General automotive jobbers and automotive electrical jobbers have demonstrated their capacity for successful and profitable radio wholesaling. It has been demonstrated that radio fits into this field. MOTOR WORLD WHOLESALE will have a department of radio wholesaling as well as a department of electrical wholesaling, and will devote attention to replacement parts wholesaling, of tire wholesaling, etc.

THAT the question of more efficient wholesaling is attracting the attention of manufacturers and others who are studying the economics of distribution is evidenced by recent comments of Herbert Hoover, Secretary of Commerce, who has referred to the problems connected with this phase of business and the desirability of reducing wholesaling and distribution costs.

To this great work MOTOR WORLD WHOLESALE will apply itself, carrying on its policy of past years of producing a strong, constructive, fair, fearless business paper.

MOTOR WORLD WHOLESALE will be the business paper of the automotive wholesalers. Its columns will be at their disposal for the discussion of all subjects relating to their business.

Major Units of New Indiana 4-5-Ton Truck Easily Detachable

Powerplant, gearset or rear axle can be removed and replaced by man and helper in half an hour. Radiator guard and shutters form one unit hinged to frame.

By Herbert Chase

QUICKLY detachable major units, designed to facilitate service operations and permit of ready substitution of spare units when overhauling is required, and a novel form of combined radiator guard and shutter assembly are the most important features of the latest truck to be put into production by the Indiana Truck Corp. of Marion, Ind.

This new product, known as model 41, is rated at 4- to 5-ton capacity and is characterized by an unusual and substantial appearance, as will be seen from the accompanying cuts. This appearance results largely from the novel form of radiator guard and hood which, beside having an uncommon contour, are designed to control cooling of the radiator and ventilation of the hood compartment.

High grade standard components are used in this design, but their assembly to the 8-in. rolled section frame constitutes an interesting engineering study. Radiator guard, entire powerplant, gearset and rear axle all are mounted on hinged or trunnion brackets which assure proper alignment and greatly facilitate detachment and other service operations.

A four-cylinder 4½ x 6¼-in. model DU Waukesha engine with Ricardo heads, is the chief unit of the powerplant. This is carried in a three-point mounting, the front end being swiveled in a bracket, the ends of which are tubular and turned on the outside to fit into split bearings or trunnion blocks, the upper halves of which are hinged to swing forward when the nuts on the bolts which hold them are removed. The rear support is from two similarly cranked arms attached to the bellhousing and resting in similar trunnions.

Carried on shelf brackets attached to the forward engine support is a radiator core, the top tank of which is flat except for an approximately cubical extension to which is attached a cast filler fitting with a branch for connection to the water outlet manifold. The core is held in an upright position by a stay rod which is attached to the head of the engine instead of to the dash as in usual practice.

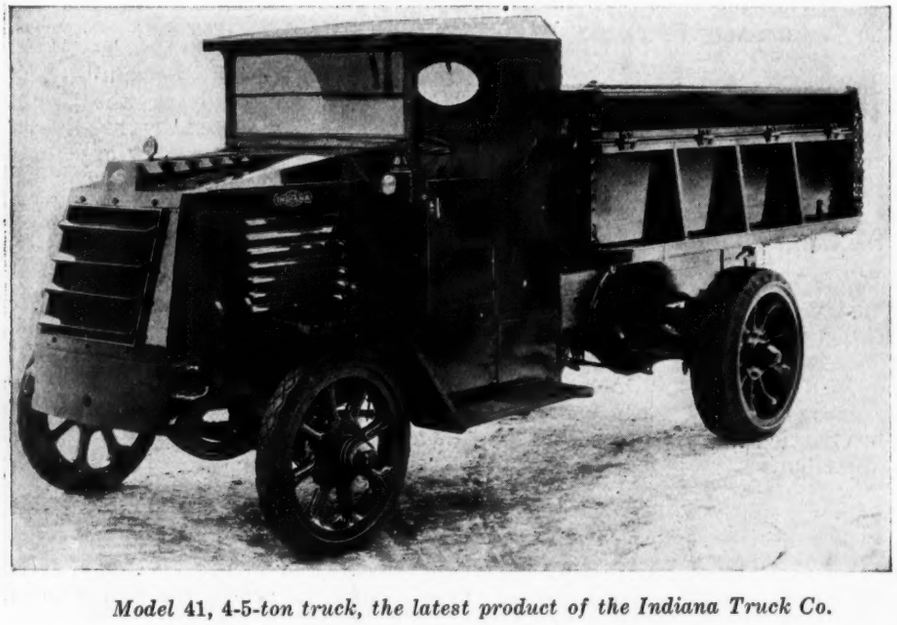
It is worthy of note that the core is entirely separate from the shell and is supported in such a way as to be free from strains to which the frame of the truck is subjected.

Clutch Mounted in Flywheel

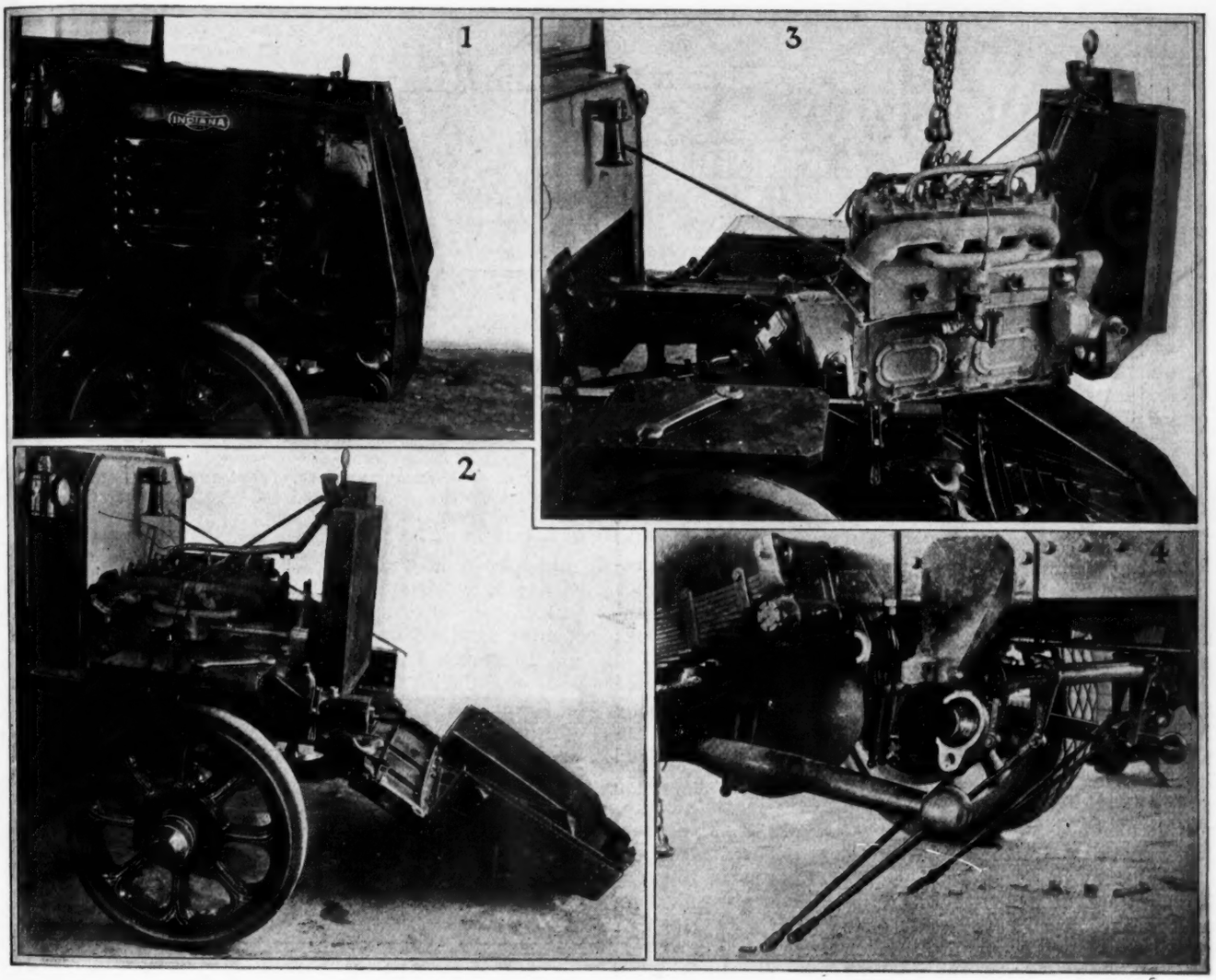
A Borg & Beck clutch with single 14-in. plate is mounted within the flywheel and inclosed by a bellhousing from the rear end of which projects a Spicer universal joint and propeller shaft driving to the seven-speed gearset mounted amidship. At its forward end the gearset is carried in two trunnion blocks similar to those which position the engine, while at the rear end it is held by a bracket forming a swivel mounting for the third point of support. It can be dropped out of the frame quickly and easily if extensive repairs are required.

Drive from the rear of the gearset is by a pair of Spicer universals and shaft to the rear axle, which is a semi-floating Sheldon product with worm gear drive. The worm is mounted in radial and double thrust bearings and the worm gear on combination double-row thrust and radial bearings. The rear axle is attached to the chassis by a pair of radius rods and a pair of semi-elliptic springs shackled at both ends.

The lower shackle bolts at both ends of the springs trunnion are held in split bearings by hinged caps opening downward. When the bolts which hold these caps are released and similar caps supporting the ball and socket joints at the forward ends of the radius rods are freed, and brake rods disconnected, the whole rear axle unit can be rolled out from under the truck, the propeller



Model 41, 4-5-ton truck, the latest product of the Indiana Truck Co.



Four views of sections of the new Indiana 4-5 ton truck. 1—Unusual hood and combined radiator guard and shutter. 2—Bumper and radiator guard lowered to facilitate removal of powerplant. 3—Powerplant lifted out of chassis after unclamping trunnion block caps which are hinged and seen thrown back. 4—Rear end of truck showing hinged radius rod sockets and trunnion blocks for rear spring shackle bolt fastening. The axle when thus disconnected can be rolled out from under the truck

shaft slipping out of the splined portion of the universal joint at its forward end. With this construction it is a matter of but a few moments' work to remove the entire rear assembly.

In an accompanying cut is shown a view of a part of the rear axle unit after it has been disconnected from the chassis and is ready to be rolled from under it. This view shows also the downwardly extending brake lever arms which are placed in this position in order that the turning of the axle under the influence of braking torque will apply the brakes further rather than to partially release them, as is the case with upstanding levers.

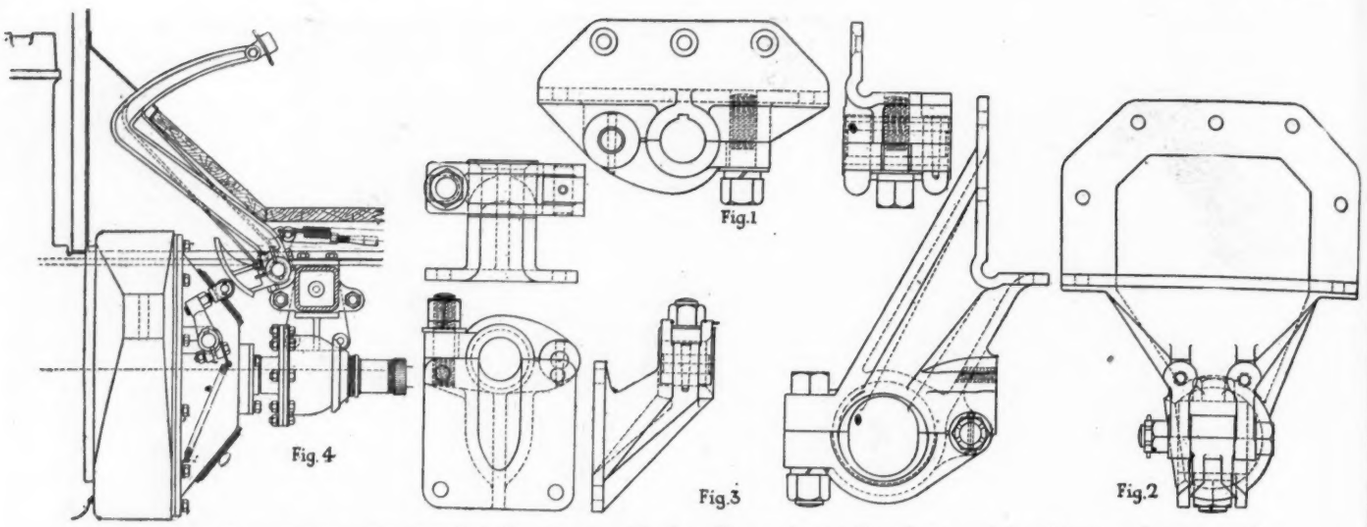
Brakes are of the expanding type, both sets being located inside the brake drums. which are of 20 in. diameter, The foot brake shoes are 4 in. wide and the hand brake shoes 3 in.

Reference to another of the cuts given herewith will show that the combined radiator guard and shutter is bolted rigidly to a cast front bumper, which forms the front member of the frame. This assembly is hinged to brackets attached to the extreme front ends of the side rails and when in position is held by a pair of bolts which secure it rigidly to these brackets. The rear end of the radiator guard then is held against the frame by a pair of hood latches. When these latches and the two bolts are released the assembly can be swung forward until it rests on the floor and is out of the way so that the power plant can be slid forward in the process of removing it from the chassis.

How Engine Is Removed

The entire operation of removing the power plant can be performed, it is claimed, by a mechanic and helper in 15 min. or less. When the hood is removed and the raidiator guard is lowered the engine can be disconnected entirely from the chassis by releasing and swinging back the four trunnion caps, disconnecting gasoline and exhaust line unions, the throttle lever, the rod which operates the radiator shutters and the wire running to the ignition switch. The engine then can be lifted from the chassis with a chain hoist hooked into an eyebolt which is connected permanently to the head of the engine.

As the powerplant is slid forward the propeller shaft connecting to the gearset slips out of the forward universal joint. The clutch does not have to be disconnected because it is operated by a roller which contacts with a rocker shaped cam attached to the clutch pedal.



1—Rear spring bracket. 2—Bracket for front end of radius rod. 3—Bracket used for front and rear engine supports. 4—Detail of clutch pedal, showing cam and roller which can be separated without disconnecting any clevices when engine is removed from chassis

When the engine is replaced the foregoing process is reversed and can be done in about the same time. Proper alignment of the engine is assured, because the trunnions are forced to seat properly in the trunnion blocks when the caps of the latter are bolted in place.

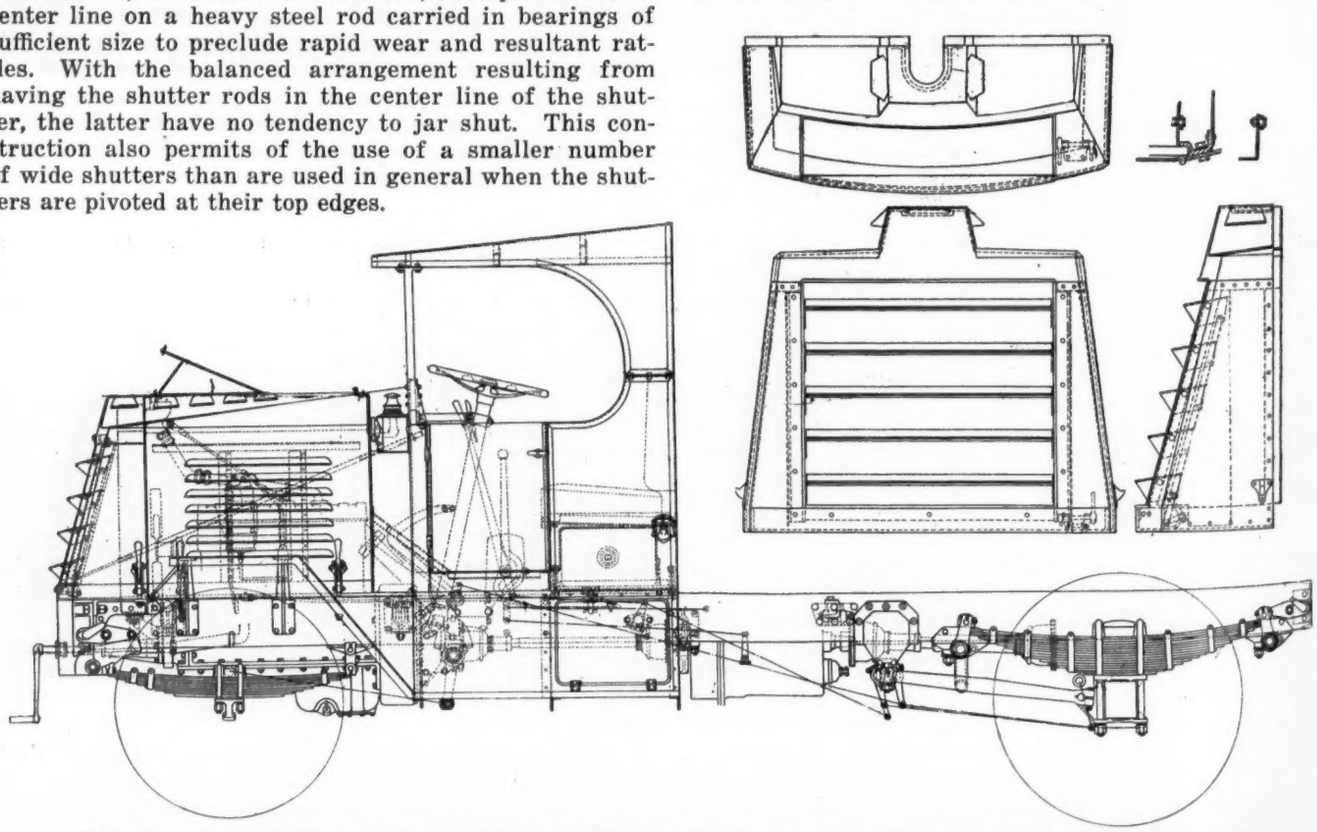
These operations are so simple and so easily performed that it is said to be a saving of time to remove the engine from the chassis even for so simple an operation as cleaning carbon and grinding valves, since the work required in this case then can be done on a stand where all parts of the engine are within easy reach of the mechanic.

Side members of the radiator guard are of substantial sheet metal and steel angle which, in case of injury in collision, can be straightened easily. They serve to carry the shutters, of which there are four, each pivoted at its center line on a heavy steel rod carried in bearings of sufficient size to preclude rapid wear and resultant rattles. With the balanced arrangement resulting from having the shutter rods in the center line of the shutter, the latter have no tendency to jar shut. This construction also permits of the use of a smaller number of wide shutters than are used in general when the shutters are pivoted at their top edges.

The hood is made in three sections, two side units with long horizontal louvres and a top section with a sort of monitor or raised section having additional louvre openings and a door hinged at its rear edge.

A Ross cam and lever steering gear with 20-in. wheel is fitted. Springs are of alloy steel, 3 x 40-in. nine-leaf in front and 3½ x 50-in. 17-leaf in rear. Wheels are Smith metal type with 8 spokes front and 10 spokes rear. Front tires are 36 x 5 in. single front and 40 x 12 giant singles rear. Track is 63½ front and 69¾ rear, and the turning radius 27 ft.

This truck is furnished in two lengths of wheelbase, 146 in. for dump body and 170 in. for cargo body. Body weight allowance is 1800 lb., total maximum load 11,800 lb. and weight of chassis 8200 lb.



Side elevation of Indiana model 41, 4-5 ton truck, showing location of various units referred to in the text. Above are details of combined radiator guard and shutter unit

Just Among Ourselves

King Automobile Returns to Palace

SO the New York Show is coming back to the Grand Central Palace again. Well, well, well! That doesn't make us mad at all. Now we can speak more freely the thoughts that came into our head as we battled the subway crowds last January and struggled through the snowdrifts to reach the Silver Anniversary Show. Of course, it really wasn't so bad a trip as some people said. The story that one man started uptown in a taxicab at the end of the first automobile show at Madison Square Garden and just reached the Bronx as the doors opened for the Silver Anniversary exhibit has been definitely disproved by Peekan Pry, detective editor of AUTOMOTIVE INDUSTRIES, after a detailed investigation covering two months and 18 sheets of foolscap. Just the same, the decision to move back to New York seems to meet with the hearty approval of everybody, and Sam Miles can expect, without fear of disappointment, to start his second quarter-century of shows with the most successful exhibit of them all.

Hutchinson and Vance Confirm an Opinion

WE wrote an article for our Feb. 12 issue in which we removed from our chest several vials of wrath which had been accumulating for some time anent the dirty deal often given to the automotive industry by general business writers. We pointed out, among other things, that you can become an alarmist about most anything you like if you just set your mind to it, and that the best days of the automotive industry lie ahead. Naturally we felt pretty sure we were right about what we said or we wouldn't have printed it. But we feel surer than ever now that our opinion has been confirmed by O. C. Hutchinson, Hupp's sales manager, because we've found in the past that when he agreed with us we usually were right. And then H. S. Vance, of Studebaker came along with the statement that the ideas were "timely and sound." That made it unanimous.

Says Best Days of Industry Ahead

HERE'S part of what Hutchinson wrote to us the other day: "There has been more loose talk in and about the automobile industry than any other manufacturing or merchandising industry. In spite of all this idle gossip and the many rumors current concerning this or that manufacturer or the industry as a whole, I firmly believe that there are more opportunities for good business men to engage in motor car merchandising than in any other line of business today. . . . The demand for motor car transportation is so universal that the market will continue indefinitely for 2½ to 3½ million cars every year." It's our personal opinion that this stabilized production estimate is a bit conservative.

Is a Used Car Ever Worth a New Car Price?

FACTORIES in general have spent a lot of time and money impressing on dealers the necessity for using sound judgment in making trading allowances. It is not sensible, everybody agrees, to give more for a used car than can be obtained for it in resale. Consequently, dealer advertisements, which have been running recently in the West, offering full list price on traded-in 1924 Fords, Chevrolets, Overlands and Stars, have come as something of a jolt to the many automobile men who have been trying so hard to build up a new used car attitude. These advertisements have a particularly unfortunate influence because they purport to carry the sanction of the factory building the car advertised. Merchandising of this kind doesn't do the industry as a whole any good—at least three prominent automotive men who have written to us about the advertisements think that way about it.

Big Cars, Small Cars and Traffic

NEW car sales figures in New York City have indicated that big cars recently have been making a somewhat better showing relatively than small cars. This is just opposite to the general idea that increasing traffic congestion, which certainly is continuing, tends to promote the sale of smaller vehicles. Seeking a possible explanation of the sales figures, we got a rather ingenious one from the sales manager of a New York distributing organization. "Congestion is so bad and parking spaces so few," he said, "that every man who possibly can afford it, is hiring a chauffeur. When he is able to have a chaffeur, he doesn't worry about the size of his car nor about the few hundred dollars necessary to get a big one." We thought the interpretation good enough to pass along, although personally we stick to the original conception that increased congestion will promote small car sales.

Newspaper report from Denmark says that Henry Ford has forbidden workmen at his Copenhagen plant to drink beer with their luncheons and that a committee of workers is waiting on the management to protest. Seems as though gasoline tanks are the only kind wanted around the plant.

N. G. S.

Motor-Drive One Feature of New Detroit Centerless Grinder

Machine as redesigned also has almost infinitely variable feed for stock, combined anti-friction and plain bearings on wheel spindle, and a swiveling feed wheel and work guides.

IN addition to having been provided with a self-contained electric drive for the grinding and feed wheels, the new No. 4-C centerless grinder of the Detroit Machine Tool Co. has had incorporated in it such features as an almost infinitely variable rate of feed for the stock, an unusual combination of anti-friction and plain bearings on the wheel spindle and a feed wheel and work guide mounted on a common swiveling table. It is, furthermore, entirely devoid of the gears usually employed for obtaining the various rates of feed, etc.

All of the distinctive features of the earlier model have been retained in the new design, however. The feed wheel is approximately twice the width of the grinding wheel, and is located directly below the latter, so that the work to be ground is supported and rotated by the feed wheel. Adjustment for the maintenance of the finished size after dressing the wheel, is made by elevating the entire feed wheel carriage by means of a worm and jackscrew, the hand wheel on the worm shaft being graduated in 0.0001 in. In addition to the features discussed in the previous paragraph, the new machine is much heavier and is capable of grinding work of 4¾ in. maximum diameter and up to 16 ft. in length. Diameters larger than 4¾ in. can be accommodated by special raising blocks and lengths exceeding 4-5 ft. require special devices for supporting the overhanging ends.

As may be seen from Fig. 1, a common base forms the support for the grinding wheel spindle head, the feed wheel and work guide table and the electrical equipment, which latter is mounted at the back. The lower portion of the base comprises a coolant tank of 80-gal. capacity. The grinding wheel spindle head is fixed by means of keys and bolts on the upper scraped surface of the base. The spindle proper is driven by a belt from a 15-hp. motor, which is located on the back of the machine near the bottom. As shown by Fig. 2, the belt passes over two idlers before engaging with the pulley at the outer end of the wheel spindle. In order to maintain correct belt tension, these idlers are mounted on a common pivoted bracket. Therefore, adjustment of the bracket affects the length of both sides of the belt.

Cast-Iron Wheel Guard

A substantial cast-iron guard covers the wheel and serves as the mounting for the diamond truing device, which is controlled by the hand wheel at the extreme top. The diamond or, if desired, other form of truing device, is carried at the lower end of the box-section arm, which is shown. This arm also carries a hardened steel contact point which engages with a hardened steel strip to determine the form of the grinding wheel. The steel strip is hinged and provided with a screw adjustment to correct for any indication of tapered work. Where the work is plain cylindrical, the steel strip has a flat surface.

Fig. 3 is a line drawing of the spindle construction, in which annular bearings carry the belt and end thrust loads, and an adjustable bronze bushing carries the wheel load. By this construction long life is insured at the bearings of the driving end, chatter is eliminated at the grinding end of the spindle and the friction load is reduced to a minimum.

In order to insure correct alignment between the scraped bearing at the wheel end and the annular bearings at the pulley end, a comprehensive manufacturing scheme has been worked out. The inner race is ground with the spindle and the outer race is pressed into the head and lapped in conjunction with the bronze bearing by means of a special arbor. Then special hardened rolls are ground to a metal-to-metal fit between the two races of the roller bearing. The ball bearing is fitted to carry only end thrust loads. The bronze bearing is taper-machined on the outer diameter, and therefore is adjustable. Oil is circulated by means of the thrower ring about midway of the spindle. This ring dips into an oil bath and

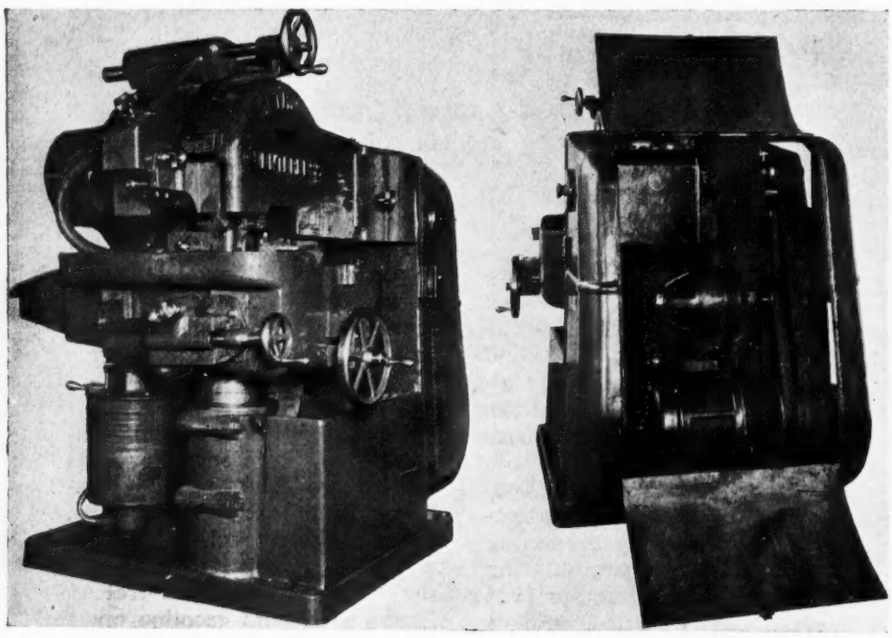


Fig. 1—Operating side of new Detroit electrically driven centerless grinder showing rheostat for controlling direct current motor (at the left), emergency stop switch and unique work table construction

Fig. 2—Rear view, showing alternating current drive motor, small electric generator which produces current for variable speed feed wheel drive and details of the belt arrangement

throws the oil to deflector webs. Return grooves and felt packing glands at both ends of the spindle construction prevent the entrance of dirt.

Both the grinding wheel hub and the drive pulley are mounted on keyed taper ends and secured by threaded construction. The wheel is 18 in. in diameter with a face of 4 in., and straight sides, the hole for the adapter being 10 in. in diameter. The drive pulley is 5½ in. wide with a diameter of 10 in.

A 10-inch cylindrical column carries the entire work table which incorporates the work wheel and guide bracket assemblies. Although this column is cylindrical and ground, it is keyed in the base, and the table is swivelled

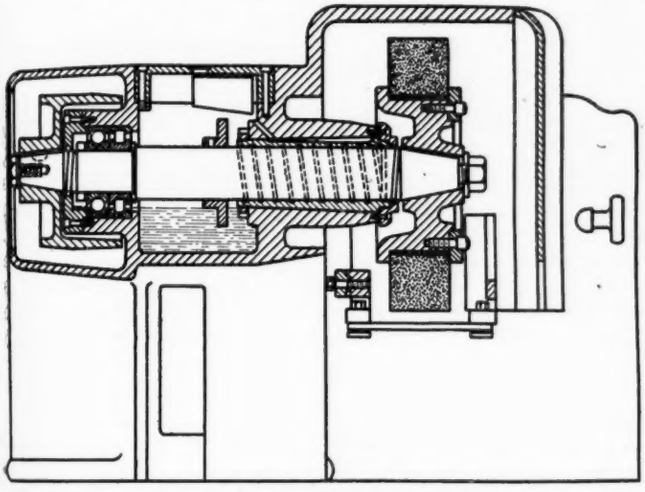


Fig. 3—Cross section of grinding wheel spindle construction. Annular bearings carry belt and thrust loads and adjustable bronze bearing prevents chatter at the wheel

separately at its top. The rate of advance of the work across the wheels is controlled by the extent of the angle to which the table and therefore the axis of the feed wheel is swung away from the axis of the grinding wheel. The maximum for this machine is 8 deg., and this feature, combined with the 25 different motor speeds and two selections of gear reduction, makes a range of travel across the feed wheel, which varies from 1.69 to 89.6 ft. per min.

As shown at the left of Fig. 1, a direct current, variable speed motor of 1 hp. is suspended from the work table. A rheostat having 25 points controls the motor speed, and the entire motor unit can be swung with its mounting in a combination of screw and eccentric to engage either of two worm gear reductions at the feed wheel drive spindle. The feed wheel is driven by a construction resembling that of a full floating rear axle, the drive shaft running in ball bearings in the interior of a fixed sleeve which also forms the stationary bearing for the babbitted journal of the feed wheel. The feed wheel, which is 10 in. in diameter and 8 in. long, is built up of hard abrasive on a cast iron core; it has no grinding action on the work, but serves merely to rotate the piece while approaching and in contact with the grinding wheel.

A diamond dresser is provided for the feed wheel, being mounted on the front of the work table and controlled by a hand wheel. The slide for this dresser is adjustable, and to insure cylindrical work with no taper, is set in the vertical plane at the same angle at which the feed wheel axis varies from that of the grinding wheel. This dressing action takes place at right angles to the true line of contact of the work with the feed wheel, therefore, parallelism of the two wheels and of the feeding action is insured.

While the work is fed by the lower wheel, direction across the wheels is maintained by guides which are mounted on a bracket at the back of the work table. Original adjustment of these guides is made during the set-up to bring the work to the theoretical lines of contact with the two wheels. This point is somewhat ahead of the line between the centers of the two wheels, in order to avoid pinching the work and producing lobular instead of true cylindrical surfaces. As the guides are mounted on the table with the feed wheel, no further adjustment is necessary until the feed wheel is worn appreciably, and this wear is extremely slow.

Driving Motor in Base

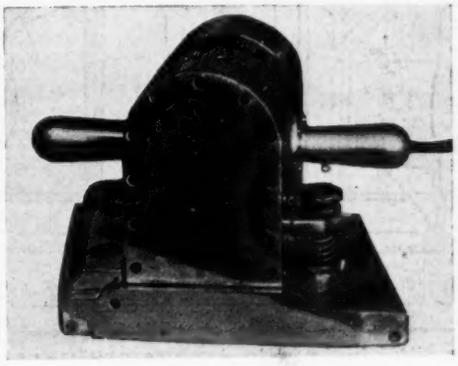
On the back of the base, as shown in Fig. 2, are mounted the driving motor, a direct-current generator of 1½-hp. capacity, and the rheostat coils. Like the coolant pump the direct-current generator is driven from the shaft of the alternating-current motor. This is standard construction except in cases where dependable direct current is available, and the machine produces its own direct current for driving the feed wheel at variable rates. In most shops having direct current the load on the line varies to such an extent that this source of power is unreliable for determining the speed of the feed wheel.

A rheostat for controlling the direct current and a push button switch for the emergency control of the entire machine are shown at the right of Fig. 1, which also shows all of the various control wheels and is the operating side of the unit. The coolant pump is at the bottom at the opposite side of the machine and is driven by a cross belt from the alternating current motor shaft. The pump is located within the base of the machine and is immediately accessible when a cover plate is removed. All of the mechanical details are located on the outside of the boxlike base. The tank in the bottom has a shelving floor which forms a sediment trap at the portion farthest removed from the pump intake.

Cast iron and perforated steel covers protect the entire driving mechanism, the latter being used to insure ventilation of the electrical equipment. In addition to the oil reservoir for the grinding wheel spindle, liberal oil compartments are located adjacent to every moving or wearing part. Length and width overall are 72 in. and 54 in. respectively. The maximum height is 70 in. and the weight is 6500 pounds.

Portable Sander Introduced

A PORTABLE electrically driven sander for use on flat surfaces has been introduced recently by Barker & Co., 642 W. Washington Blvd., Chicago. It consists of a 1/3 hp. electric motor mounted in a housing and driving a drum to which the sandpaper is attached. The base of the machine has rollers which guide the machine and control the depth of cut. It is stated that the sandpaper can be changed in less than one minute.



Barker portable electric sander

The machine measures 9 x 10 x 15 in. and the weight is given as 23 lb.

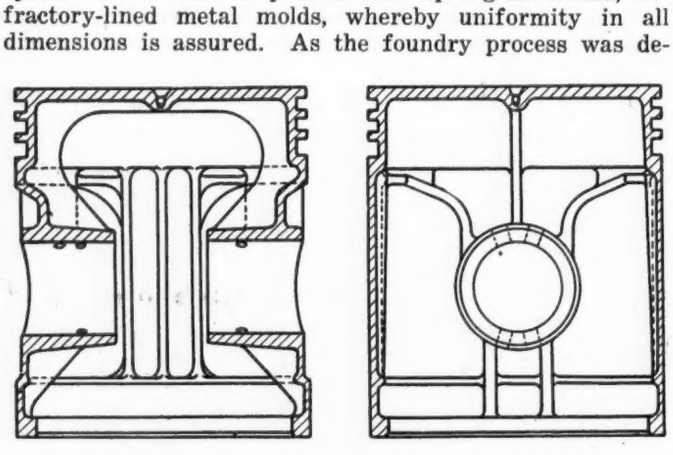
Simple Equipment Used to Machine Pistons Accurately

Permanent mold casting eliminates need for aging and for providing balancing lugs. Production line at Holley plant makes it easy to shift from one size or type to another.

By W. L. Carver

At the plant of the Holley Carbureter Co. in Detroit there was placed in operation recently a production line for machining iron pistons cast by a unique permanent mold process which combines features of economy and flexibility. Three sizes of piston of two entirely different types are completely machined, inspected and packed, although the floor space occupied is only about 3600 sq. ft. The "line" consists entirely of simple, standard machines, which in some instances are fitted with special equipment. Production can be shifted from one size or type of piston to another almost instantly, all that is required at most stations being interchange of fixtures and small tools, while at others, where several tools must be set for the longer operations, a number of machines are grouped around one operator and are kept running continuously.

One of the outstanding factors determining details of the production system is that the tolerance on the weight of these pistons in regular production is only 0.01 lb. plus or minus, which eliminates the need for balancing lugs and other provisions for correcting weight variations. These close limits, of course, are made possible by the improved foundry process, which yields homogeneous castings free from sand, scale, blow holes and hard spots. The metal is poured into spring-controlled, refractory-lined metal molds, whereby uniformity in all dimensions is assured. As the foundry process was described in detail in AUTOMOTIVE INDUSTRIES of March 27, 1924, only particulars referring to operations on the piston job will be discussed in this article. Suffice it to say that the total floor space devoted to piston production in the foundry is approximately equal to the area occupied in the machining operations.



Skeleton type as used in Jewett six. Fitted to .002 in. clearance

Pistons come from the casting machine at a rate of 300-400 per hour, depending somewhat on the weight of the individual casting. With the dry sand cores still in place, they are delivered in wheelbarrows to the head end of the annealing oven, made by the F. J. Goodenow Furnace Company, which is equipped with a pusher type, intermittent conveyor. As the workman lifts the castings from the floor to the platform of the conveyor, the cores drop out, although the gates and risers are still in place. In the oven, the castings are normalized at a temperature of about 1550 deg. Fahr. for a period of 20 minutes and the fuel expense for this operation is reduced by the fact that the castings are at a high temperature when they enter the oven. After cooling to approximately room temperature at the outlet of the oven, the castings are tumbled and delivered to a W. W. Sly rotary sand blast and then are ready for delivery to the machining line.

Strength Increased by Annealing

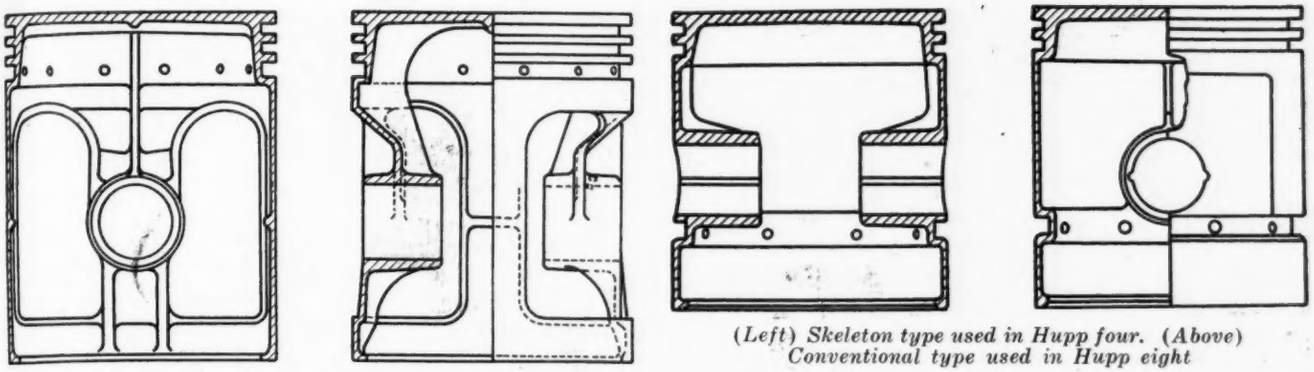
By the annealing process the compressive strength of the castings is increased by almost 100 per cent and the transverse strength in a similar proportion. A metallograph indicates that the carbon particles are evenly distributed throughout each section and are surrounded by practically pure ferrite, with little or no pearlite and combined carbon. Analysis shows no combined carbon and gives the following composition:

ELEMENT	PERCENTAGE
Silicon	2.60
Total Carbon	3.25
Manganese	0.60
Phosphorus	0.30
Sulphur	0.07

All casting strains are removed and the necessity for further seasoning is eliminated. What is still more important from the manufacturing angle, the structure of the iron is uniform throughout, with no trace of hard scale to make machining difficult. The dimensions of the castings are accurate within approximately 0.005 in.

Three pistons which are now going through the machine line are illustrated by the line drawings. With the exception of the head, the annulus inside of the ring grooves and the reinforcing ribs, the thickness is held to 1/16 in. The ring belt is depended upon for transferring the heat absorbed by the head to the cylinder wall and water jacket, and the heat channel is choked below the bottom ring, where the section which is only 1-16 in. thick. The skeleton type pistons made for the Hupp-4 and the Jewett can be fitted very closely, as this iron has a coefficient of expansion slightly less than that of sand-cast iron. In fact, one company has successfully completed a road test with a car in which the clearance between pistons and cylinders is only 0.001 in., with only 2 qt. of oil in the crankcase.

In the first operation in the machining line, the center in the lug on the head is countersunk and the lower end of the skirt is faced and counterbored. Thus the centers



(Left) Skeleton type used in Hupp four. (Above) Conventional type used in Hupp eight

for all subsequent turning and grinding operations are formed. This operation (see Fig. 1) is performed on a Bardons & Oliver turret lathe. A small electric motor is mounted on the slide, taking the place of the turret, and drives the countersink spindle through a slip shaft and two universal joints. If the centering were done with the turret it would determine the total time for the entire operation. Counterboring the bottom of the skirt is done by a tool carried on the apron, while the cam-shaped plunger on the turret slide operates the cross feeding mechanism as shown in the foreground. For this operation the pistons are centered on a 4-pin expanding chuck which is operated by an air cylinder at the outer end of the headstock spindle. All three sizes of piston are machined at this station, the tool change required for changing from one to another being comparatively simple. A minimum production of 125 pieces per hour is easily maintained.

Holes Rough-Drilled

From the first operation the pistons are passed back to a four-spindle Avey drill press, where the piston pin holes are rough-drilled. One man operates the four spindles and may be running all three sizes of piston simultaneously, as the jigs are free on the table and only the drill has to be changed to obtain complete flexibility. As shown in Fig. 2, the pistons are held on centers clamped by a hand screw and piloted in Vee blocks at both pin bosses. These Vee blocks are spring-actuated and move back to compensate for slight variations at the pin bosses. They serve only to align the drills symmetrically in the pin bosses.

From this operation the pistons are passed along to a battery of Sundstrand-Stub lathes where the skirt and head are rough-turned and the ring grooves are roughed out, as shown in Fig. 3. The man at the right operates four machines on the roughing operation while the man at the left operates another group which perform the fourth operation, consisting of semi-finish turning the skirt and head. These set-ups involve the greatest number of tools, and the Stub lathes therefore are not shifted from one size of piston to another, but run constantly on one job.

Following the fourth operation, the pistons are passed to a Warner & Swasey No. 4 plain screw machine which is equipped with an air chuck and a draw-in collet, the latter being changed quickly to suit each size of piston. In this operation the piston is held with the open end outward and the edge of the counterbore at the lower end is chamfered. For the sixth operation the pistons are returned to another battery of Sundstrand-Stub lathes, where the grooves are semi-finished and finish-turned. One group of tools is carried on the rear carriage, and practically a duplicate set is mounted on the front carriage.

At this stage the pistons enter the final finishing operations, the first of which, or the seventh in the line, consist of rough and finish-grinding in a Cincinnati Plunge-Cut grinder as shown in Fig. 4. The piston is carried on centers and the grinding wheel takes a full-width cut. After grinding the pistons are passed along to another Warner & Swasey No. 4 plain turret lathe for a machine reaming operation. A clamping ring is mounted on the headstock spindle and is changed for each side. As shown in Fig. 5, a pilot plug is inserted into the rough pin holes before the head is clamped tight. Then the piloted machine reamer is swung around into position to complete the operation.

In the ninth operation the relief holes are drilled in the lower ring grooves, and in the tenth the oil supply holes are drilled in the pin bosses of the skeleton type pistons while in the eleventh the pin bearings are finish reamed. Operation No. 9 is performed in an Avey drill press, as illustrated at the left of Fig. 6. The fixture is of the ratchet indexing type. The operator holds the piston over the head on the fixture spindle with his left hand and operates the drill feed lever with his right hand. The simplicity of this fixture belies its speed characteristics. The holes are just over 1-16 in. deep and are drilled just as rapidly as the operator can move his hands through a very short distance. As he backs off the drill he advances the piston and head through the space of one notch, and then presses the head back against the radial flank of the index ratchet plate.

Fig. 6 also illustrates the hand reaming head which was built in the Holley shop and is used for operation No. 11, although the reamer is sometimes mounted in any available lathe. The fact that a satisfactory finish can be maintained in production by an adjustable hand reamer is the best indication of the character of the iron. In the machine shown in Fig. 6 a friction disk is mounted on the reamer spindle and is driven from a countershaft which is belted to an electric motor. Fig. 7 illustrates the tenth operation on skeleton type pistons. The oil supply holes for the piston pin bearings are drilled in an Avey 3-spindle drill press. The piston is mounted on a dummy pin and indexed at the center in the head for the supply holes. In the Jewett piston, in addition to these, drain holes are drilled in the pin bosses. In this case the dummy pin is used again, but the piston is indexed at the counterbore in the bottom of the skirt. The required angularity of the holes is obtained by angular surfaces at the bottom of the fixtures, as indicated by the idle fixture in the foreground of Fig. 7. This is also a very speedy operation.

Lathe for Cutting Head

Following this operation, the centering boss on the head is cut off and a light cut is taken clear across the head. As illustrated in Fig. 8, this operation is also performed in a Warner & Swasey No. 4 lathe which is equipped with an air chuck at the left end of the spindle and a draw-in collet that carries the piston. On the cross

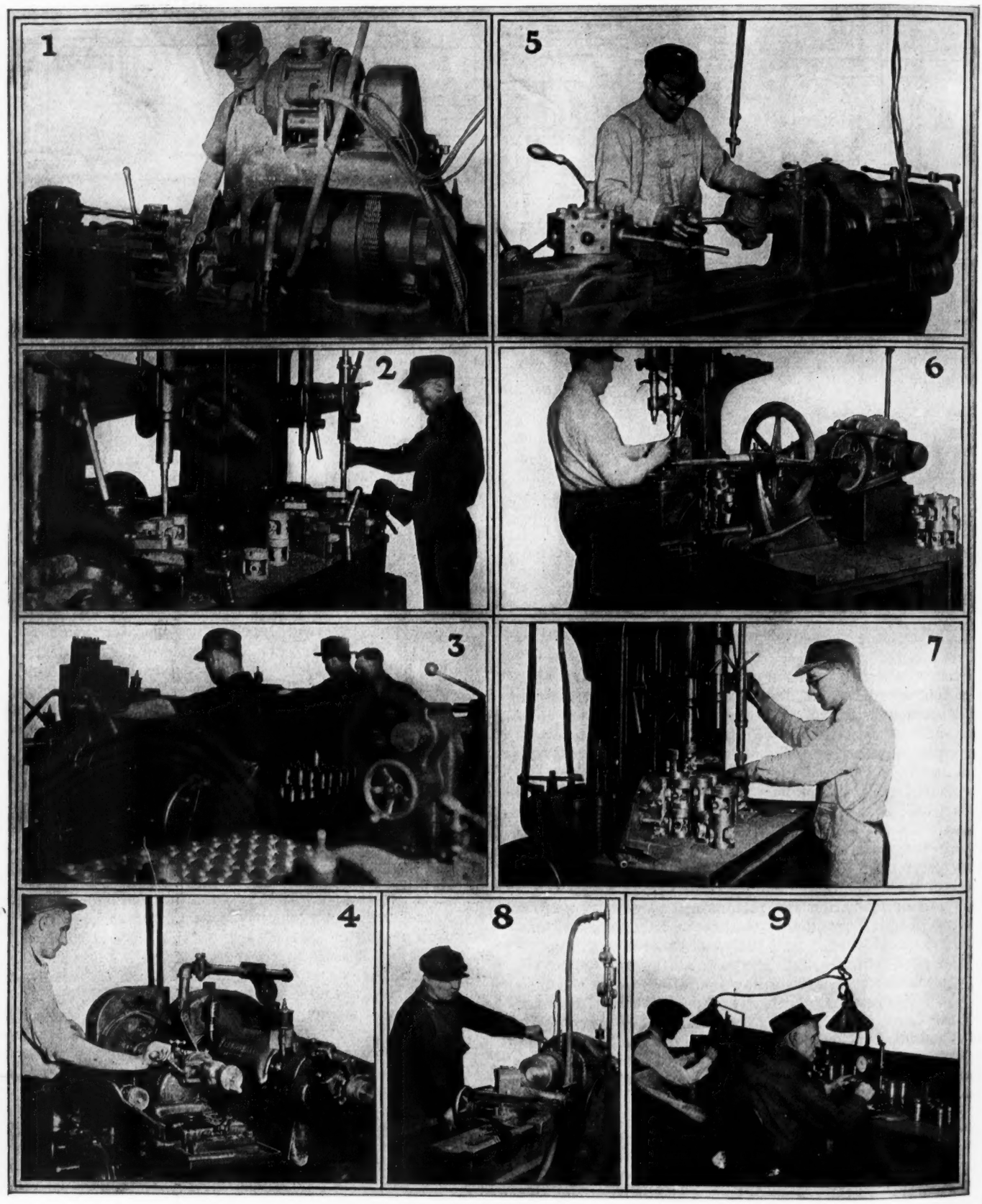


Fig. 1—First operation in the machining line. The electric motor drives the countersink for centering the head. Fig. 2—Rough drilling piston pin holes on an Avey 4-spindle drill press. Three different sizes in process simultaneously. Fig. 3—Battery of Sundstrand Stub lathes engaged in rough turning head and skirt. One man operates four machines. Fig. 4—Rough and finish grinding in a Cincinnati Plunge-Cut grinder. The wheel finishes full width. Fig. 5—Machine-reaming the pin bearing in a Warner & Swasey machine. The clamping head is changed for each size. Fig. 6—Friction driven hand reaming head at the right. At the left, drilling relief holes in the lower ring groove in an indexing fixture. Fig. 7—Drilling oil supply holes. Note simplicity of jig in the foreground. Fig. 8—Removing centering lug and finishing head. Fig. 9—Piston inspection. An angle plate and a dial gage reading to 0.0001 in. form the principal equipment

slide the tool post is set diagonally and carries the cut-off tool for the lug in advance of the facing tool for the surface of the head. Only hand feed is used, and the spindle is rotated at high speed. This is the only machine used at this station for the various sizes of piston, therefore the collet is changed for each size.

Fig. 8 also illustrates the last two operations in the actual production line. Just to the left of the man at the lathe another man is engaged in disk-grinding the surface of the head. This is a hand operation and only a slight polishing cut is taken, just enough to eliminate the tool marks of the previous operations. The machine is a Gardner No. 2, electrically driven disk grinder. At the extreme left of Fig. 8 another man is engaged in operation 14 which consists of wire-brushing the edges of the ring grooves by means of a wire brush mounted on the shaft of an electric motor. This operation furnishes further evidence regarding the character of the iron in these pistons. With the ordinary sand-cast iron, owing to its highly crystalline nature, the corners at the ring grooves, instead of being sharp and clean, chip off and present a bad appearance, and this is claimed to hasten wear on rings and grooves. With these permanent mold pistons the corners of the ring grooves are absolutely clean, in spite of the fact that the tooling is not characterized by any fuzziness. The property of the metal to which this is due is also brought out by an inspection of the chips from the various turning and drilling operations which, instead of being powdery, as with sand-cast iron, are slightly brighter and of definite spiral form.

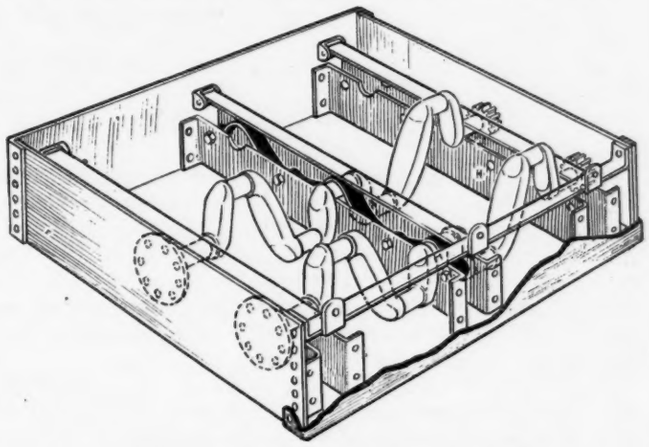
Inspecting Operations

Only a small part of the shop space is occupied by inspecting operations. First, the width of the ring grooves is checked, and then the diameters are verified, as illustrated in Fig. 9. For checking ring groove widths use is made of a number of thin, washer-like disks mounted on a flat handle for convenience. Each of these disks is machined to a predetermined thickness which represents the range between limits of groove width. The diameter is checked on an angle plate equipped with ground liners and dial gages measuring to 0.0001 in. In checking the skeleton types the diameter is measured down the bearing surfaces on the skirt and then around the full ring at the bottom. Occasionally the full ring is slightly out of round and this is corrected by tapping with a light mallet. This operation is the only compromise with ultra-refinement in the entire line and is resorted to in order to prevent misunderstanding in the inspection departments of the plants receiving the pistons. As a matter of fact, the lower ring will conform immediately to the bore of the cylinder in which the piston is placed. It is claimed that the fact that light tapping corrects the contour permanently demonstrates that there are no casting strains and that there is therefore no need for aging of the castings.

Finally, the pistons are passed over a scale and checked for weight, and it is most interesting to see pistons which have come through a line so free from ultra-refinements go through this inspection within limits of plus or minus 0.01 lb. The pistons are then packed for shipment in partitioned corrugated paper boxes.

Each machine in the line has individual motor drive, and this, in connection with the fact that the various operations require about the same amount of skill, accounts for the flexibility of the line. Furthermore, each operation is simple, hence the labor problem is simple and production can be stepped up almost instantly by merely increasing the number of men on the line. During periods of slackness one man can operate a half dozen machines, while in rush periods one man can be placed at each station. This method of operation is feasible only when simple, standard machines are used. Specialists are not required at any point of the line, and a new man can be instructed in any one operation in a few minutes. In the end the simplicity and flexibility must be attributed to the improvement in foundry practice which has resulted in castings of more nearly uniform structure and more nearly exact dimensions.

A Protective Case for Crankshafts



Williams' case for shipping crankshafts

MERRITT WILLIAMS of Greenview, Ill., in his experience as garage owner often had crankshafts that were shipped to him by the factories become damaged in transit, and as a result he designed what he calls a case for shipping such shafts. The sketch herewith produced illustrates the device, which accommodates several crankshafts and permits convenient packing and safe shipping.

The construction is quite plain from the drawing, but it may be said that the case consists of channel bars placed parallel with each other and provided with milled recesses to take the crankshafts. A strap fastener holds the cranks securely in place.

Fuel Can Be Over-Refined

FROM the standpoint of economy of production, it is desirable to retain in a gasoline as large a proportion of the heavy, low volatility constituents of the original crude oil as can be efficiently burned in the engine. Incomplete combustion is not only wasteful of fuel but produces further difficulties, such as carbon formation and the thinning of the lubricating oil by dilution with unburned gasoline. Hence it is very important to have the process of refining carried to just the right point—if the point is exceeded, the production cost is unnecessarily high; if it is not reached, the saving in production cost will be more than offset by the losses due to inefficient use.

A criterion of great value in estimating the usability of a given fuel, and hence of determining the degree to which refinement should be carried to satisfy given conditions of use, is the minimum temperature at which a mixture of fuel and air such as enters the engine cylinders can be kept completely vaporized. The Bureau of Standards has made an extended investigation on this subject, which will be fully described in a forthcoming scientific paper. It was found that the average fuel enters the cylinder in liquid condition, i.e., as spray, unless the mixture is heated in the manifold many degrees above summer air temperature.

Three Sizes of Bus Generator Fixed as Standard by A. E. A.

Types selected believed to cover present requirements of all buses and will permit operation at either one or one and a half times engine speed.

By A. H. Packer

THREE sizes of electric generator were tentatively agreed upon as standard for motor bus service at the standardization meeting of the Automotive Electric Association held at Cleveland, Ohio, on March 2. The details of a test for battery ignition systems were also settled, and an interesting demonstration bearing on various phases of bus illumination was presented by a representative of a lamp concern.

Earl Turner, secretary of the A. E. A., opened the meeting and immediately turned it over to Thomas L. Lee, who, as chairman of both the Standards Division of the A. E. A. and the Electrical Equipment Division of the S. A. E. Standards Committee, presided at the sessions.

After the question of axle ratios, wheel sizes and engine speeds had been considered at some length, Col. G. A. Green told of the experience of the Yellow Coach Mfg. Co. He stated that a 300-watt machine had been found satisfactory for single deck buses and a 600-watt machine for double deck buses, but expressed the opinion that for the smaller single deck buses a 200-watt machine would be preferable in view of the price at which such a vehicle must be sold.

Three standard sizes of generator were then proposed, viz., 250-watt at 1000 r.p.m., 400-watt at 1200 r.p.m., and 600-watt at 1400 r.p.m., the idea being advanced that a machine driven at one and one-half times crankshaft speed would prove the most satisfactory ultimately

It was realized that for the present some installations would require engine-speed generators, which have to be larger to develop the same output. The sizes indicated were accordingly selected, so that the 600-watt frame could, with changed windings, be used as a 400-watt machine running at engine speed, while in similar manner the 400-watt machine, rewound for engine speed, would be capable of delivering about 250 watts.

The data was then turned over to a sub-committee in order that other details, such as permissible temperature rise, could be worked out, it being understood that these proposed standards were to be adhered to unless others should be found more desirable. At the present time lack of experience as to what the electrical power requirements of a bus really are make hard and fast standards difficult to formulate, but, on the other hand, a lack of some sort of standard would tend to create a chaotic condition in years to come. Hence the desire to center design efforts around a limited number of sizes, even if some change in one or more sizes is found desirable eventually.

A sketch of a proposed standard gap for battery ignition tests was submitted by Burns Dick, chief engineer of the Automotive Division of the Wagner Electric Corp. Mr. Dick recommended testing battery ignition sets at 4, 6 and 8 volts, using for this purpose 2, 3 and 4 cells of a well-charged storage battery. These tests would show the coil performance under starting conditions, idling conditions and during operation at speeds where the generator is sending current to a fully charged battery, tests to be made at 50, 100, 400, 600, 800, 1000, 1200, 1600, 2000, 2400, 2800, 3200, 3600 and 4000 r.p.m. of the engine.

Other conditions of the standardized test include the following:

1. Test to be made at room temperature (about 75 deg. Fahr.).
2. All sparks discharged at test gap.
3. Maximum gap to be considered reached when skips occur at about 10 sec. intervals.
4. Standard breaker point gap to be used.
5. Voltage at coil terminals to be considered ignition voltage.
6. Sparks to be run through distributor.
7. High tension end of coil negative.
8. Needles renewed for each test.

On 12-volt coils the voltages mentioned are to be doubled in each case.

The difference between good and bad bus lighting was graphically portrayed by A. C. Roy of the Edison Lamp Works of the General Electric Co., a knock-down "covered wagon," as he called it, being used to illustrate what happens inside the bus. Through the center of this "covered wagon" a curtain was drawn and on one side four 21-cp. lamps were wired up with No. 16 wire, while on the other side similar lamps were wired up with No. 10 wire. The difference was amazing

Proper Lighting as a Factor in Bus Popularity

THE importance of providing adequate and scientific lighting systems on buses was emphasized at the standardization meeting of the A.E.A.

A study of voltage drop in wiring, for example, was shown to be essential in getting the right results.

Plenty of light properly distributed has proved to be of high value to the bus operator in merchandising his service to the public and anything which tends to promote the success of the man who is buying buses should be encouraged by the manufacturer.

and showed the need of giving proper attention to voltage drop in bus wiring. The following table illustrates the reason for a radical change in the amount of light available with a seemingly inconsiderable loss of voltage:

6-8 Volt Lamps

Voltage at Lamp Socket	Candle-Power Output of Lamp
7.00	23.0
6.50	21.0
6.25	19.3
6.00	15.5
5.75	13.8
5.50	11.5
5.25	9.2
5.00	7.8

Mr. Roy pointed out that on account of the large size wire required to prevent a considerable voltage loss with a 6-volt system, it is quite desirable to use 12-volt systems.

Different Types of Lamps

The same portable bus section or "covered wagon" was used to show the difference of light distribution with different types of lamps. On one side was a lamp fixture which did not allow the light to go upward, where it could be diffused by the light ceiling. This fixture gave but little light to the advertising cards and hence seriously limited their advertising value. At the same time it focused the light downward so as to cause a bright spot on a newspaper, with surrounding portions of the paper less well illuminated.

On the other side of the bus a parabolic fixture of glass was used which spread the light downward more evenly, allowed much light to pass to the advertising cards and permitted about 20 per cent to strike the ceiling which, being light colored, reflected it. Light colored finish for the bus interior was strongly recommended as an aid to good lighting.

The commercial advantage of good lighting was brought out by the statement that on one line where both well-lighted and poorly-lighted buses were used some passengers would wait 15 min. in order to ride in the well-lighted vehicles. The advantage of a curb or step light to illuminate the ground where the passengers must walk in getting in was shown, and it was said that 14 per cent of the loading time was saved by good curb lighting. With poor lighting or none at all passengers would get in slowly, feeling their way to keep from stepping on obstructions or into mud puddles.

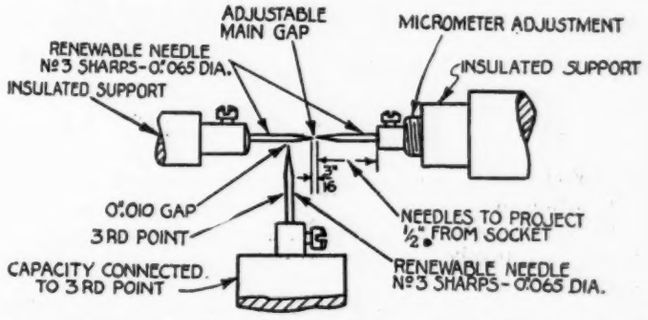
The matter of light intensity desirable in buses has been thoroughly investigated. On the New York subways it was found that 5 foot-candles is best, but on account of the vibration in buses, which makes print hard to read, it was recommended that 7 foot-candles be made the standard. This means approximately 8 cp. for each seated passenger, so that in a bus capable of seating 25 people, lights aggregating 200 cp. would be recommended. As a minimum the figure of 5 foot-candles as used in the New York subways was mentioned.

Wire Sizes Recommended

Wire sizes were recommended by Mr. Roy as follows: For 12-volt systems, No. 12 wire for individual circuits, with No. 8 for the common return; for 6-volt systems, No. 10 for the individual circuits, with No. 6 for common return.

A wiring diagram for bus lighting circuits was shown in which the voltage loss to all lamps is the same, this result being attained by having one end of one of the parallel wires between which the sockets are connected run to the battery, while the opposite end of the other wire is grounded. It was said that in many present buses the wiring is such that lamps at one end of the bus are bright while those at the other end are dim.

A pamphlet in manuscript form designed to enlighten service station men in regard to efficient lighting and the maintenance of good lighting on customers' cars was considered by the meeting, this having been prepared by C. A. Atherton of the National Lamp Works of the General Electric Company. It is the intention to publish this and make it available to all who care to distribute it.



Arrangement of adjustable spark gap for ignition coil test as proposed by Burns Dick for A. E. A. standard

At the close of the meeting a letter was read from Mr. Lee in which he asked to be relieved of the duties of chairmanship of the A. E. A. Standards Division, because so much of his time was taken up by his work for the S. A. E. His wish was acceded to and Burns Dick was elected to take his place. The next meeting was scheduled to be held in Cleveland on May 4.

How One Light British Car Performs

A GOOD idea as to the performance of a British light car (light as judged by American standards) is to be had from the official report of tests made recently under the open competition rules of the Royal Automobile Club on Brooklands track. This car, known as the A. C., is equipped with a six-cylinder 2.56 x 3.94 engine and weighs 1869 lb. without load. It has 117 in. wheelbase, is equipped with an open four-seater body and during the tests carried an average load of 645 lb. Balloon tires 28 x 4.95 in. were fitted. The car is geared 4.33 to 1 on high, 8.31 to 1 on second and 15.4 to 1 on low gear. The engine makes 3100 r.p.m. when the car is traveling at 60 m.p.h. on high gear.

In the test the car was found capable of running as slow as 2.59 m.p.h. on high gear; attained in the flying half-mile a maximum speed of 64.65 m.p.h.; climbed the test hill, the average gradiant of which is approximately 1 in 5, at a speed of 14.34 m.p.h. on first gear and accelerated from 10 to 50 m.p.h. in 36.4 sec.

In two reliability tests the car was driven 604.5 miles at an average speed of 35 m.p.h. with a fuel consumption of 22.8 miles per U. S. gallon. It also covered 150 miles at an average speed of 50 m.p.h. and 52 miles at an average speed of 57.6 m.p.h. Fuel consumption tests in which the car was driven for approximately one hour at each of the following speeds: 10.24, 20, 30, 40.21, 50.63 and 58.25, showed that the car was capable of traveling 21.9, 19.6, 22.7, 21.6, 17.7 and 14.2 miles per U. S. gallon respectively, at the speeds mentioned.

Only three minor adjustments were required during all of the foregoing tests. Both hand and foot brake, applied separately, were found capable of checking and holding the car on the steepest part of the test hill.

Interstate Bus Line Decisions Less Sweeping Than at First Supposed

Chief point made was that no State can bar Interstate bus lines merely because they compete with existing routes which render satisfactory service. States not deprived of control.

By H. L. Cobb

TWO decisions of far-reaching importance in the regulation of interstate motor vehicle traffic were handed down last week by the United States Supreme Court. Both cases involved State permission to operate a motor vehicle line for public hire over an interstate route.

Close study of the two decisions shows that the chief point made in each of them is that no State can bar interstate bus companies from operating within its boundaries merely because such companies would compete with existing lines rendering satisfactory service.

Maryland officials seem to think the opinion of the Supreme Court in the case of Maryland against George W. Bush & Sons Co. less sweeping than at first was supposed. Early impressions had been that the decision would have the effect of depriving the State of all control over interstate bus lines.

Light was thrown on the matter by receipt at the office of Thomas H. Robinson, Maryland's Attorney General, of copies of the decision in the Buck case, from the State of Washington, which was handed down with the ruling in the Maryland case. It is now believed that all the Supreme Court decided was that a State could not decline to grant a permit because the proposed line would come into competition with a common carrier which already had been granted a franchise.

It now appears that nothing in the opinion indicated that any interstate line would be relieved from any reasonable regulation for the protection or upkeep of the roads so long as such regulations are made uniform for all. The Buck opinion is longer and more explanatory than the one handed down in the Maryland case.

Governor Ritchie, it is known here, believes the people of the State had been alarmed unduly by the opinion.

"One must read the opinions in both the Maryland and Washington cases to understand the situation properly," he says. "I can't see any reason to believe that a fleet of buses and trucks is coming into the State to ruin our roads or that the opinions of the Supreme Court give them any license to do so."

Salient Points in Decision

Following are salient portions of the text of the two Supreme Court decisions:

Opinion in the Buck Case in the State of Washington—"This is an appeal, under paragraph 238 of the Judicial Code, from a final decree of the Federal Court for Western Washington dismissing a bill brought to enjoin the enforcement of paragraph 4 of Chapter III. of the Laws of Washington, 1921. That section prohibits common carriers for hire from using the highways by auto vehicles between fixed termini or over regular routes, without having first obtained from the Director of Public Works a certificate declaring that public convenience and necessity require such operation. The highest court of the State has construed the section as applying to common carriers engaged exclusively in interstate commerce. The main question for decision is whether the statute so construed and applied is consistent with the Federal Constitution and the legislation of Congress.

Washington Refuses License

"Buck, a citizen of Washington, wished to operate an auto stage line over the Pacific Highway between Seattle, Wash., and Portland, Ore., as a common carrier for hire exclusively for through interstate passengers and express. He obtained from Oregon the license prescribed by its laws. Having complied with the laws of Washington relating to motor vehicles, their owners and drivers, and alleging willingness to comply with all applicable regulations concerning common carriers, Buck applied there for the prescribed certificate of public convenience and necessity. It was refused. The ground of refusal was that, under the laws of the State, the certificate may not be granted for any territory which is already being adequately served by the holder of a certificate, and that, in addition to frequent steam railroad service, adequate transportation facilities between Seattle and Portland were already being provided by means of four connecting auto stage lines, all of which held such certificates from the State of Washington.

"An additional ground for refusing the certificate was that the applicant did not appear to have financial ability. This ground of rejection does not require separate consideration; among other reasons, because the plaintiff later asserted in his bill that he possessed the requisite financial ability, and the motion to dismiss admitted the allegation.

"By motion to dismiss filed in this court, the State makes contention that Buck is estopped from seeking relief against the provisions of paragraph four. The argument is this:

" 'Buck's claim is not that the department's action is unconstitutional because arbitrary or unreasonable. It is that paragraph four is unconstitutional because use of the highways for interstate commerce is denied unless the prescribed certificate shall have been secured. Buck applied for a certificate. Thus he invoked the exercise of the power which he now assails. One who invokes the provision of a law may not thereafter question its constitutionality.' "

"The argument is unsound. It is true that one cannot in the same proceeding both assail a statute and rely upon it. Nor can one who avails himself of the benefits conferred by a statute deny its validity. But in the case at bar Buck does not rely upon any provision of the statute assailed, and he has received no benefit under it. He was willing, if permitted to use the highway, to comply with all laws relating to common carriers. But the permission sought was denied. The case presents no element of estoppel. Reversed."

The dissenting opinion of Justice James C. McReynolds in both the Washington and Maryland cases follows:

"I am of the opinion that the courts below reached correct conclusions in these cases.

"The States have spent enormous sums in constructing roads and must continue to maintain and protect them at great cost if they are to remain fit for travel.

"The problems arising out of the sudden increase of motor vehicles present extraordinary difficulties. As yet nobody definitely knows what should be done. Manifestly, the exigency cannot be met through uniform rules laid down by Congress.

"Interstate commerce has been greatly aided—amazingly facilitated, indeed—through legislation and expenditures by the States. The challenged statutes do not discriminate against such commerce, do not seriously impede it and indicate an honest purpose to promote the best interests of all by preventing unnecessary destruction and keeping the ways fit for maximum service.

"The Federal Government has not and cannot undertake precise regulation. Control by the States must continue, otherwise chaotic conditions will quickly develop. The problems are essentially local and should be left with the local authorities unless and until something is done which really tends to obstruct the free flow of commercial intercourse."

Opinion in the Bush case in Maryland prepared by Justice Louis D. Brandeis denying the right of the Maryland Public Service Commission to prevent bus lines from operation in the State.

"A statute of Maryland prohibits common carriers of merchandise or freight by motor vehicles from using the public highways over specified routes without a permit. The Public Service Commission is charged with the duty to 'investigate the expediency of granting said permit' when applied for; and it is authorized to refuse the same if it 'deems the granting of such permit prejudicial to the welfare and convenience of the public.' Laws of Maryland, 1922, C 401, paragraph 4.

"George W. Bush and Sons Co. applied for a permit to do an exclusively interstate business as common carrier of freight over specified routes, alleging its willingness and intention to comply with all applicable regulations concerning the operation of motor vehicles. After due hearing, the permit was denied.

Not a Question of Road Damage

"This suit was brought in a court of the State to restrain the State officials from interfering with such use of the company's trucks. The bill alleged, and it was admitted by demurrer, that the highways were not unduly congested; that they are so constructed that they can carry burdens heavier that that which would be imposed by plaintiff's trucks; that the operation of its trucks would impose no different burden upon the highways than the operation of the trucks of the same kind and character by private persons, which was freely permitted; and that, in refusing the permit the commission had considered, merely, 'whether or not existing lines of transportation would be benefitted or prejudiced and in this way the public interest affected.'

"The plaintiff claimed that, regardless of permit, it was entitled to use the highways as a common carrier in exclusively interstate commerce. The trial court dismissed the bill. Its decree was affirmed by the highest court of the State. (143 Maryland, 570). The case is here on writ of error under Paragraph 237 of the Judicial Code.

"This case presents two features which were not present in Buck vs. Kuykendall, No. 345, decided this day. The first is that the highways here in question were not constructed or improved with Federal aid. This difference does not prevent the application of the rule declared in the Buck case. The Federal-aid legislation is of significance, not because of the aid given by the United States for the construction of particular highways, but because these acts make clear the purpose of Congress that State highways shall be open to interstate commerce.

"The second feature is that here the permit was refused by the commission, not in obedience to a mandatory provision of the State statute, but in the exercise, in a proper manner, of the broad discretion vested in it. This difference also is not of legal significance in this connection. The State action in the Buck case was held to be unconstitutional, not because the statute prescribed an arbitrary test for the granting of permits, or because the Director of Public Works had exercised the power conferred arbitrarily or unreasonably, but because the statute as construed and applied invaded a field reserved by the commerce clause for Federal regulation. Reversed."

1924 Statements Show Profits Don't Follow Production Line

(*Continued from page* 488)

It may be in the engineering department, in the production line, in the factory sales office or in the dealer organization. But something is wrong somewhere and no amount of alibi-ing can set it right. The net profit figure at the end of the year summarizes briefly the successes or failures of every man in the factory organizations.

That's why the net profit figure is so important and so illuminating. That's why it should be viewed by every man in a producing organization in relation to his own work, and by every manager in relation to his determination of future policy.

It's easy to reply to all this by saying, "Why, of course, what you say is true, but everybody knows that and everybody does look at the profit and loss statement pretty carefully. And after all what can an individual executive do about it? He has to be governed by the policies of his organization."

Well, the individual executive might have a stronger personal influence on the policies of his company if he had a more intimate understanding of the net profit figure and how the work of his department contributed to or detracted from keeping that figure high. And if the heads of all major departments were thinking in terms of net profits, rather than in terms of specific, detailed considerations, the results of conferences might be more constructive than they sometimes are.

Suppose you were the salesmanager of a company which had increased its production and sales by 50 per cent last year and you noticed that, despite that increase in merchandising activity, the net profit had remained stationary. Wouldn't that fact give you pause? Wouldn't you like to try to figure out whether expensive sales methods in your department were responsible for the existing condition, or whether some other phase of company policy was responsible for making it necessary to work several times as hard to get the same results as in the previous year?

That's just one example. Similar ones might be cited to apply to practically every important executive head in the factory.

It is safe to predict, at any rate, that the figures for net profits will get much more general attention than in the past and that they will take their place beside the production statistics in luncheon table conversations about the progress of the industry and of individual companies in it.

Europe Continues to Show Great Diversity in Airplane Design

England leads in development of "light" type. Water-cooled three and four-row motors popular in France. German machines mostly monoplanes. Italy concentrates on heavy war designs.

By Leslie S. Gillette

THE current types of European airplanes when compared with American machines continue to show a much greater diversity in design, size and number of motors. The machines built in England compare somewhat closely in design and layout with those in this country, while in France there is a growing tendency toward the thick wing monoplane type. Germany is necessarily building commercial types of aircraft only and continues to favor the single-engine, inclosed cabin monoplanes. In Italy, machines of both the large and small types are constructed in equal quantities and divided proportionately between the land and sea-going classes. No particular change can be recorded in the airplanes built in Holland.

A marked decrease this year in the number of European airplanes built for commercial use and a corresponding or even greater increase in those produced for war purposes can be seen by comparing the specifications of all leading makes listed in the following tables with those shown in the previous specifications published last year in AUTOMOTIVE INDUSTRIES. This condition has doubtlessly been brought about by three factors: The general tendency of practically every European country to increase the size of its air service; a lesser number of individuals who fly purely for pleasure, and, finally, the fact that the air lines which virtually cover the northwest corner of Europe have not required additional equipment because there has been no immediate need for further extension of these air routes.

In view of each country having practically its own particular styles of machine, a better picture of design trends can be had by reviewing the development in each country separately. It is interesting to note that while there has been little change in the number or status of the manufacturers, an increasing number of machines of various types have been produced during the past twelve months.

Single Motors in England

England, perhaps more than any other country, has developed the "light" class of airplanes during the past year. In this particular field considerable originality and ingenuity have been shown in their design. In many instances the "light" types are smaller editions of the regular full-sized machines. Very few multi-engined machines are now being constructed, the general practice seeming to be toward the use of single but more powerful motors. An Avro bombing machine fitted with a solitary Napier engine developing over 1000 hp. recently completed its tests and passed into the production stage. In machines of the smaller class, air-cooled radial engines of approximately 400 hp. are now being used while the majority of the remainder are fitted with 450 hp. water cooled three row motors.

Several new models of war machines, such as torpedo carriers, amphibians, deck flyers and 25-passenger troop carriers were produced last year, the latter type being used almost exclusively in the British Near East possessions in cooperation with the infantry. Over 80 per cent of British aircraft are thin wing tractor biplanes being externally braced and covered with canvas.

France continues to show great diversity in airplane design, although the building of large multi-engined machines has been slightly curtailed. The fitting of air-cooled radial and rotary types of motors, which long have been characteristic features of French planes, is now being superseded by water cooled three and four-row motors.

Increase in Monoplanes

While there was a noted increase in the number of monoplanes produced last year, the majority of the larger type were destined for research expeditions and the civil air lines, with smaller editions equipped as single seater fighters and racing machines. The former were mostly of the thick wing variety and the latter of the "parasol" type. The recapturing of the world's speed record was made on a Bernard monoplane fitted with a 550-hp. Hispano-Suiza motor.

Germany, being the pioneer in the adoption of the thick internally braced wings, it is not surprising to note that 84 per cent of the machines built there last year were monoplanes and that there were no machines of the strictly pusher type. According to the specifications, none of the latest types of aero engines are being used, yet several machines are carrying from six to eight passengers with an approximate total horsepower of 260 and in one instance a machine having a 75-hp. radial motor has been flying successfully, carrying four passengers. The German machines undoubtedly have the lowest horsepower-passenger ratio of any now being built.

Italy, which continues to build in increasing numbers varied types of giant multi-engined machines for use on both land and sea, is paying relatively little attention to the development of these types for commerce. In fact, more than 90 per cent of all machines produced last year were for war purposes, with a large portion of them equipped for long distance night bombing. High powered water cooled motors are used almost exclusively in all machines and there is a marked trend toward the six-cylinder vertical type. Several high performance machines have been produced.

Holland is building a number of new machines this year and the major part may be credited to the design of A. G. Fokker. As a large portion of the output of the Fokker factory is absorbed by the requirements of various governments, there is a large range of both commercial and war machines

Foreign Airplane Specifications

MAKE AND MODELS	CHARACTERISTICS: Class	Type	Designed for	GENERAL DIMENSIONS (ft. ins.): Seating Capacity Including Pilot	Length	Height	Wings of Folding Type?	Main Wings: Span	Chord	Total Area	ENGINE: Make	Number	Total Horse Power	Type	PERFORMANCE: Speed (Miles Per Hr.): Full Throttle (Sea Level)	Speed (Miles Per Hr.): Landing	Climb: Altitude (Ft.)	Climb: Minutes	WEIGHTS (lbs.): Endurance at Cruising Speed (Hrs.)	Fully Loaded	Useful Load	Per H.P.	Per Square Foot of Surface
BRITISH																							
A.D.C. DH9	TrBi	LandMac.	DayB	2	30–10	11–8	No.	42–6			Siddeley Puma	1	240	Ver	110	57	10000	18¾	4½	3654	400		
A.D.C. DH9A	TrBi	LandMac.	DayB	2	30–4	11–4	No.	46–0			Liberty 12	1	400	Vee	120	59	10000	6¾	5¾	4883	950		
A.D.C. SE5A	TrBi	LandMac.	FigS	1	21–0	9–6	No.	26–8			Wolseley-Viper	1	210	Vee	125	55	6500	6	2½	1980	150		
A.D.C. F4	TrBi	LandMac.	FigS	1	25–9	9–0	No.	32–9			Hispano Suiza	1	300	Vee	142	45	10000	6½	2½	2492	300		
A.D.C. Snipe	TrBi	LandMac.	FigS	1	19–10	8–9	No.	31–0			BentleyBR2	1	200	Rot	121	55	10000	9	3	2020	275		
A.D.C. Bristol	TrBi	LandMac.	Recon	2	25–8	10–1	No.	29–3			Hispano Suiza	1	300	Vee	113	48	10000	11¾	3	3175	450		
Armstrong-W. Siskin5	TrBi	LandMac.	FigS	1	21–4	9–4	No.	28–4	6–0	256	Siddeley"Jag"	1	385	Rad	155	55	10000	6	2¾	2450	420	6.36	9.57
Armstrong-W. 4-3	TrBi	LandMac.	Pas&F	22	65–0	19–0	No.	89–6	12–0	1880	Siddeley"Jag"	3	385	Rad	110	50	10000	40	4½	17000	5000	15.0	9.0
Avro. Bomber	TrBi	LandMac.	DayB	2					‡‡	‡‡	Napier	1	1000	4"X"	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Avro. 504K	TrBi	LandMac.	EleTr	2	28–0	10–9	No.	36–0	4–9¾	320	GnomeMono	1	100	Rot	82	37	5000	11	‡‡	‡‡	‡‡	‡‡	‡‡
Avro. 504N	TrBi	LandMac.	Adv-Tr	2	28–0	10–9	No.	36–0	4–9¾	320	Siddeley Lynx	1	180	Rad	95	40	5000	7	‡‡	1818	598	16.1	5.68
Avro. 533A	TrBi	LandMac.	DayB	3	36–4	13–0	No.	60–0	7–6	820	Siddeley Puma	2	500	Ver	115	50	5000	7½	‡‡	2056	604	11.4	6.43
Avro. 548	TrBi	Seaplane	AdvTr	2	31–1	11–10	No.	36–0	4–9¾	324	Renault	1	100	Vee	80	38	5000	12½	‡‡	7454	2584	14.9	9.09
Avro. 552	TrBi	LandMac.	Adv-Tr	2	28–0	10–9	No.	36–0	4–9¾	320	Wolseley-Viper	1	210	Vee	98	48	5000	11	‡‡	2704	604	12.9	8.45
Avro. 552A	TrBi	LandMac.	Adv-Tr	2	28–0	10–9	No.	36–0	4–9¾	320	Wolseley-Viper	1	210	Vee	104	43	5000	6½	‡‡	2304	604	11.0	7.2
Avro. Aldershot	TrBi	LandMac.	DayB	2	‡‡	‡‡	No.	‡‡	‡‡	‡‡	Rolls Royce	1	650	Vee	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Avro. Bison	TrBi	LandMac.	DekF	2	‡‡	‡‡	No.	‡‡	‡‡	‡‡	Napier	1	450	W	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
††Beardmore WB2	TrBi	LandMac.	Recon	2	27–7	10–11	No.	35–0			Beardmore	1	200	Ver	105	55	1000	19	3¼	2516	300	17.5	7.1
††Blackburn Swift	TrBi	LandMac.	TorC	1	34–10	12–3	Yes.	48–6	7–9	720	Napier	1	470	3"W"	109	45	10000	21	3½	6300	2718	13.4	8.7
Boulton & Paul "Bolton"P15	TrBi	LandMac.	DayB	3	48–5	14–6	No.	62–6	8–6	9324	Napier	2	900	3"W"	135	54	10000	11½	6	9238	3510	10.2	9.9
Boulton & Paul. "Bodm."P12	TrBi	LandMac.	MailC	3	53–4½	18–6	No.	70–0	10–0	1370	Napier	2	900	3"W"	116	56	10000	16	6	11000	3075	12.2	8.0
Boulton & Paul. "Bugle"P25	TrBi	LandMac.	DayB	3	39–9	14–0	No.	65–2	8–6	932	Bristol	2	800	Rad	120	54	10000	15½	5½	8760	3681	9.7	9.2
Bristol. 89	TrBi	LandMac.	Adv-Tr	2	25–0	10–1	No.	39–3	5–6	405	Bristol	1	400	Rad	133	52	10000	8¼	3¾	3250	378	8.12	8.02
Bristol. 84	TrBi	LandMac.	Recon	2	26–6	10–8	No.	39–11½	7–0	487	Bristol	1	400	Rad	126	54	10000	11½	5½	4236	471	10.58	8.7
Bristol. 83	TrBi	LandMac.	EleTr	2	24–4¼	9–3½	No.	31–1⅛	5–3	284½	Bristol	1	100	Rad	82	49	5000	18	3	1740	340	17.4	6.12
Bristol. 73	TrBi	LandMac.	Sport	3	24–4¼	9–3½	No.	31–1⅛	5–3	284½	Bristol	1	100	Rad	82	52	2000	5¾	5	2000	500	20.0	7.03
English-Electric. AyrM3	TrBi	FlyingB	Recon	4	40–8	13–8	No.	46–0	9–0	466	Napier	1	450	3"W"	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
English-Electric. KingstonP5	TrBi	FlyingB	Recon	7	49–2	21–2	No.	85–6	9–0	1341	Napier	2	900	3"W"	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Fairey. Model3	TrBi	LandMac.	DekF	3	36–0	13–0	Yes.	46–1½			Napier	‡	450	3"W"	120	48		4½	‡‡	‡‡	‡‡	‡‡	‡‡
Fairey. Model3	TrBi	Seaplane	Recon	3	36–0	13–0	Yes.	46–1½	‡‡	‡‡	Napier	‡	450	3"W"	117	50	10000	12½	‡‡	‡‡	‡‡	‡‡	‡‡
Fairey. Pintail	TrBi	Amphib	DekF	2	36–0	11–6	Yes.	40–0	6–0	440	Napier	‡	450	3"W"	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Fairey. Atlantic	TrBi	Seaplane	Recon	‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	Napier	‡	450	3"W"	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Fairey. Flycatcher	TrBi	Amphib	DekF	1	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	Eagle 8	‡	375	Vee	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Fairey. Flycatcher	TrBi	LandMac.	FigS	1	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	Jaguar	‡	370	Rad	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Fairey. Fawn	TrBi	LandMac.	DayB	1	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	Jupiter	‡	400	Rad	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Fairey. Atlanta	TrBi	FlyingB	Recon	‡	66–0	‡‡	‡‡	139–0	‡‡	2900	Napier	‡	450	3"W"	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
											RRCondor	‡	600	Vee	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
Gloucestershire. Gloster1	TrBi	LandMac.	RacMa	1	22–0	9–3	No.	21–0	4–6½	165	Napier	1	450	3"W"	212	75	19500	11	2	2700	180	6.0	16.4
Gloucestershire. Mars6	TrBi	LandMac.	FigS	1	19–9	9–6	No.	28–0	5–3	270	Jaguar	1	350	Rad	150	53	20000	18	2	2360	400	7.0	9.3
Gloucestershire. Grebe	TrBi	LandMac.	FigS	1	20–2¼	9–2	No.	29–0	5–3	254	Jaguar	1	350	Rad	150	52	26000	24	3	2600	445	7.55	10.1
Gloucestershire. Grouse2	TrBi	LandMac.	EleTr	2	20–2	9–5½	No.	27–11	5–3	270	Lynx	1	175	Rad	118	50	10000	15	4	2000	360	11.42	7.41
Gloucestershire. Gloster2	TrBi	Seaplane	RacMa	1	23–6	10–3	No.	20–0	4–0	150	Napier	1	600	3"W"	220	75	‡‡	‡‡	1	2500	‡‡	‡‡	‡‡
Gloucestershire. Gorcock	TrBi	LandMac.	FigS	1	21–4	9–9	No.	25–6	5–3	250	Napier	1	450	3"W"	169	59	20000	16	2	2982	406	6.2	11.9
Gloucestershire. Grebe	TrBi	LandMac.	Adv-Tr	2	20–2¼	9–2	No.	29–0	5–3	254	Jaguar	1	350	Rad	147	52	20000	26	3	2570	360	‡‡	‡‡
Gloucestershire. Gloster2	TrBi	LandMac.	RacMa	1	21–6	8–1	No.	20–0	4–0	150	Napier	1	600	3"W"	255	75	‡‡	‡‡	1	2250	‡‡	‡‡	‡‡
DeHaviland. 9	TrBi	LandMac.	Recon	2			No.	‡‡	‡‡	‡‡	Rolls Royce	1	370	Vee	134	‡‡	10000	12	3½	4200	308	‡‡	‡‡
DeHaviland. 34	TrBi	LandMac.	Pas&F	11	41–3	13–1½	No.	51–4	5–9	550	Napier	1	450	3"W"	120	61	5000	10	3½	7200	1800	16.0	13.0
DeHaviland. 42	TrBi	LandMac.	‡‡	2	‡‡	‡‡	No.	‡‡	‡‡	‡‡	Bristol	1	400	Rad	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡	‡‡	‡‡
DeHaviland. 50A	TrBi	Convt	Pas&F	5	31–0	11–7	No.	42–11	5–6	439	Siddeley	1	240	Vert	112	50	5000	9¾	3¾	4160	1107	17.5	9.5
DeHaviland. 51	TrBi	LandMac.	Pas&F	3	26–6	10–0	No.	37–0	5–0	325	RAF	1	90	Vee	97	40	5000	12	3½	2240	500	25.0	6.9
DeHaviland. Sea9	TrBi	Seaplane	Pass	3	30–10	11–8	No.	42–6	‡‡	‡‡	Siddeley	1	240	Vert	104	‡‡	5000	9	4½	3900	345	‡‡	‡‡
††Handley-Paige T	TrBi	LandMac.	TorC	1	33–0	13–0	Yes.	46–0	6–9	580	Napier	1	450	3"W"	107	45	5000	12	3½	6490	2835	14.4	9.0
Handley-Paige. W8b	TrBi	LandMac.	Pas&F	14	60–9	18–0	No.	75–0	10–0	1458	Rolls Royce	2	700	Vee	100	44	5000	15½	4½	12500	5291	17.1	8.5
Handley-Paige. W8a	TrBi	LandMac.	Pas&F	14	60–9	18–0	Yes.	75–0	10–0	1458	Napier	2	900	3"W"	120	44	7000	10	3½	12500	5291	14.0	8.6
Hawker. Duiker	PuMo	LandMac.	Recon	2	9–6	3–3	No.	15–0	3–2	‡‡	Bristol	1	380	Rad	200	78	3500	20	4¾	2136	‡‡	‡‡	‡‡
Hawker. Woodcock	PuBi	LandMac.	FigS	1	8–0	3–1	No.	10–0	3–0	‡‡	Jupiter	1	380	Rad	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
††Parnell. Possum	TrTr	LandMac.	NitB	3	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡													
††Parnell. Panther	TrBi	LandMac.	DekF	2	24–11	10–6	No.	29–6	6–3	336	Napier	1	450	3"W"	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡	‡‡
											Bentley	1	230	Rot	116	48	10000	12½	5½	2555	1004	11.1	7.6
Supermarine. 215	PuBi	Convt	Pas&F	7	37–4	15–11	Yes.	46–0	7–0	620	RREagle9	1	360	Vee	92	54	5000	20	3½	6050	2027	16.8	9.8
Supermarine. 254	TrBi	Convt	Recon	3	37–0	15–8	Yes.	46–0	7–0	620	Napier	1	470	3"W"	95	47	5000	15	4	5900	1800	12.5	9.5
Supermarine. 252	PuBi	Convt	FigS	1	27–6	12–0	Yes.	32–0	5–9	350	Napier	1	470	3"W"	145	57	10000	7½	3½	3275	847	7.0	9.4
Supermarine. 245	PuBi	Convt	Recon	3	37–3	14–5	Yes.	46–0	7–0	595	RREagle9	1	360	Vee	88	50	5000	19	4½	5900	1900	16.4	9.9
Supermarine. 255	TrBi	Convt	Pas&F	12	49–2	20–9	Yes.	69–0	10–0	1275	Napier	2	940	3"W"	105	52	5000	10¾	3	11850	3935	12.6	9.3
Vickers. Valparaiso	TrBi	LandMac.	Recon	2	32–11	11–8	No.	40–80	8–3	526	RREagle9	1	392	Vee	120	50	10000	15	5	4720	1605	12.0	9.0
Vickers. Valentia	TrBi	FlyingB	Recon	5	58–0	22–6	No.	112–0	10–6	2025	Rolls Royce	2	1340	Vee	110	53	5000	12	8	21300	7700	15.9	10.5
								83.0															
Vickers. Vanguard	TrBi	LandMac.	Troop	25	53–10	17–3	Yes.	88–0	13–0	2182	Napier	2	900	3"W"	100	47	5000	21	6	17600	6690	20.0	8.1
Vickers. Virginia	TrBi	LandMac.	NigB	4	50–7	17–3	Yes.	86–6	13–0	2166	Napier	2	900	3"W"	100	46	5000	17	13	16660	7383	17.2	7.7
Vickers. Vulcan	TrBi	LandMac.	Pas&F	9	38–0	14–11	....	49–0	9–3	834	Napier	1	438	3"W"	110	46	6000	17	3¾	6750	2351	15.4	8.1
††Westland Limousire	TrBi	LandMac.	Pas&F	6	33–6	13–0	No.	55–6	7–3	730	Napier	1	450	3"W"	118	51	6500	8	5½	6000	1030	13.3	8.2

ABBREVIATIONS:
††—1923 Machines
‡‡ Details withheld by British Government
Adv Tr—Advance Training
Amphib—Amphibian
Hor—Horizontal
Convt—Convertable
Day B—Daylight Bombing
Dek F—Deck Flying
Ele Tr—Elementary Training
Fig S—Fighting Scout
Flying B—Flying Boat (hull)
Land Mac—Land Machine
Mail C—Mail Carrier
Nig B—Night Flying Bombing
Pas & F—Passenger and Freight
Pu Bi—Pusher Biplane
Pu Mo—Pusher Monoplane
Rac Ma—Racing Machine
Rad—Radial
Recon—Reconnoissance
Rot—Rotary
Sport—Sport Machine
Tor C—Torpedo Carrier
Tr Bi—Tractor Biplane
Tr Tr—Tractor Triplane
Troop—Troop Carrier
Vee—Vee
Vert—Vertical
W—"W" *(Three Banks of Cylinders)*
X—"X" *(Four Banks of Cylinders)*

Foreign Airplane Specifications—Continued

MAKE AND MODEL	CHARACTERISTICS				GENERAL DIMENSIONS (meters)						ENGINE				PERFORMANCE					WEIGHTS (kilos)			
								Main Wings							Speed (Kilo. Per Hr.)		Climb						
	Class	Type	Designed For	Seating Capacity (Incl. Pilot)	Length	Height	Wings of Folding Type?	Span	Chord	Total Area	Make	Number	Total Horse Power	Type	Full Throttle	Landing	Altitude (M.)	Minutes	Endurance at Cruising Speed (Hrs.)	Fully Loaded	Useful Load	Per H.P.	Per Square Meter of Surface
FRENCH																							
Ateliers A	TrMo	LandMac.	FigS	1	7.40	2.70	No.	12.00	2.40	30.0	Hispano Suiza	1	300	Vee						1420	270		
Bernard B2	TrMo	LandMac.	Ra-Ma	1	6.70	2.30	No.	9.90		11.6	Hispano Suiza	1	550	"W"	393					1175			101.0
Blanchard 1	PuBi	FlyingB	Recon	4	13.85	4.10	No.	19.00		85.2	Hispano Suiza	2	520	Vee	1650		2000	16		3930	930	7.50	46.0
Breguet XIX	TrMo	LandMac.	Recon	2	9.51	3.34	No.	2.60			Lorraine	1	400	Vee	228	80	5000	29	4½	2005	820	5.10	40.0
Breguet XIX	TrMo	LandMac.	DayB	2	9.51	3.34	No.	2.60			Renault	1	480	Vee	232	80	5000	28	3½	2370	1040	4.80	46.2
Bleriot 115	TrBi	LandMac.	Pas&F	14	14.45	4.96	No.	25.00		126.0	Hispano Suiza	4	720	Vee	180					5100	2150	6.80	39.0
Bleriot 56	TrBi	LandMac.	Pas&F	7	9.05	3.18	No.	12.66		47.0	Jupiter	1	380	Rad	196		4000	50		2400	540	6.00	51.0
Bleriot 51	TrBi	LandMac.	FigS	1	6.45	3.10	No.	9.47		26.0	Jupiter	1	430	Rad	260					1276	485	2.70	52.5
C.A.M.S. 30E	PuBi	FlyingB	EleTr	2	9.38	3.12	No.	12.40		43.0	Hispano Suiza	1	140	Vee	150	60	2000	20		1270	270	9.00	29.5
C.A.M.S. 31	PuBi	FlyingB	FigS	1	8.80	3.10	No.	11.20		33.0	Hispano Suiza	1	300	Vee	200	78	5000	33		1506	426	5.10	44.7
C.A.M.S. 37	PuBi	FlyingB	Recon	3	9.38	3.20	Yes	12.40		43.0	Hispano Suiza	1	180	Vee	170	70	2000	20		1450	450	8.10	33.7
C.A.M.S. 33T	PuBi	FlyingB	Pas&F	10	13.27	4.90	No.	17.62		92.0	Hispano Suiza	2	260	Vee	175	78	3000	40		4100	1400	7.80	44.5
C.A.M.S. 38	PuBi	FlyingB	Ra-Ma	1	8.60	2.79	No.	8.60		18.8	Hispano Suiza	1	360	Vee	252	90	6500	45		1254	313	3.50	66.7
Dewoitine D1	TrMo	LandMac.	FigS	1	7.50	2.75	No.	11.50		20.0	Hispano Suiza	1	300	Vee	247	80	4000	10		350	220	4.10	
Dewoitine D14	TrMo	LandMac.	Pas&F	6	12.20	3.35	No.	18.80		45.5	Lorraine	1	400	"W"	180	75	4000	49		2800	950	6.90	92.0
Farman JABIRU	T&PMo	LandMac.	Pas&F	13	14.00	5.80	No.	19.00	6.00	81.2	Hispano Suiza	4	720	Vee	209		4000	50	4	5060	2140	7.00	62.5
Farman JABIRU	T&PMo	LandMac.	Pas&F	13	14.00	5.80	No.	19.00	6.00	81.2	Lorraine	2	800	Vee	187								
Farman 600	TrBi	LandMac.	NigB	3	14.32	5.20	No.	25.30	3.06	150.0	Farman	1	500	"W"	170				5	5514	2337	9.20	36.8
Farman F60	TrBi	LandMac.	Recon	2	14.10	4.90	No.	26.70	3.00	161.0	Farman	1	500	"W"	160				5	6410	3510	13.00	39.9
F.B.A. 17HT	PuBi	FlyingB	Ele-Tr	2	8.20	9.40	No.	12.80		36.5	Hispano Suiza	1	180	Vee	165	80	2000	9	4	1150	300	6.40	31.5
F.B.A. HM2	PuBi	Amphib	Adv-Tr	2	8.95	3.55	No.	12.87		36.5	Hispano Suiza	1	180	Vee	165	80	2000	12	3	1280	300	7.00	35.0
Gordou-Lessurre C1	TrMo	LandMac.	FigS	1	7.20		No.	9.40		18.8	Hispano Suiza	1	180	Vee	345	65	5000	17		850	170		
Gordou-Lessurre C1	TrMo	LandMac.	FigS	1	6.43		No.	7.80		12.2	Jupiter	1	380	Rad	250	90							
Hanriot H19	TrBi	LandMac.	Adv-Tr	2	7.20	3.00	No.	9.19	1.66	26.7	Hispano Suiza	1	180	Vee	175	70			3	950	180	5.20	34.5
Hanriot H25	TrMo	LandMac.	Pas&F	8	12.50	3.90	No.	17.00	3.00	51.0	Salmson	1	550	Rad	200	80				2500	835	5.00	49.0
Hanriot H31&33	TrBi	LandMac.	FigS	1	7.16	2.90	No.	11.50	1.87	34.0	Salmson	1	550	Rad	260	90				1770	300	3.10	47.7
Hanriot H37	TrBi	LandMac.	Ele-Tr	2	7.25	3.00	No.	9.20	1.70	31.3	Rhone	1	80	Rot	130	55				760	170	9.50	24.5
Hanriot H38	TrBi	Amphib	Recon	3	9.65	2.85	No.	14.00	2.80	48.0	Hispano Suiza	2	360	Vee	160	75				2170	460	6.00	25.3
Latecoere Lat6	T&PBi	LandMac.	DayB	4	15.70	4.30	No.	27.70		120.0	Lorraine	4	1040	"W"	200					5870	1720		
Latecoere Lat15	TrMo	LandMac.	Pas&F	6	11.80	3.30	No.	18.00		54.0	Lorraine	2	440	"W"	180					3100	1400		
Levessuer	TrBi	LandMac.	TorC	3	14.00	4.00	No.	15.10		73.0	Renault	1	600	"W"	75		10000	7		3365	1133	5.60	46.0
Liore & Oliver Leo13	TrBi	FlyingB	Pas&F	5	12.70	3.96	No.	16.00		58.0	Hispano Suiza	2	360	Vee			2000	16		2500	5500		
Liore & Oliver Leo12	TrBi	LandMac.	Recon	5	12.00	4.70	No.	12.00		100.0	Lorraine	2	800	"W"			5100	60		4600	1510		
Morane-Saulnier 35	TrMo	LandMac.	Ele-Tr	2	6.76	3.60	No.	10.56	1.80	18.0	Rhone	1	80	Rot	135	60	3000	21	3	700	170	8.75	38.8
Morane-Saulnier 43	TrBi	LandMac.	Adv-Tr	2	7.98	3.10	No.	10.82	1.60	28.5	Hispano Suiza	1	180	Vee	170	70	3000	14	4	1115	170	6.20	39.1
Morane-Saulnier 50	TrMo	LandMac.	Adv-Tr	3	7.65	3.10	Mo	11.70	2.20	24.0	Salmson	1	120	Rad	168	55	3000	26	4	960	250	8.00	40.0
Morane-Saulnier 51	TrMo	LandMac.	Adv-Tr	2	7.98	3.10	No.	11.70	2.20	24.0	Hispano Suiza	1	180	Vee	190	70	3000	13	4	1080	170	6.00	45.0
Nieuport-Delage 33HS	TrBi	LandMac.	Adv-Tr	2	7.75	3.34	No.	10.00	1.70	32.0	Hispano Suiza	1	300	Vee	220	85	6000	40	4	1280	230	4.26	40.0
Nieuport-Delage 38	TrBi	LandMac.	Pas&F	3	8.11	3.44	No.	10.00	2.40	40.0	Renault	1	200	Vee	160	75	4000	60	5	350	250	6.75	33.8
Nieuport-Delage 45T	TrMo	LandMac.	Pas&F	7	12.00	3.40	No.	18.00	3.50	63.0	Renault	1	550	Vee	220	85	4000	60	8	3200	600	5.80	51.0
Nieuport-Delage 40C1	TrBi	LandMac.	FigS	1	6.70	2.73	No.	9.70	1.50	26.8	Hispano Suiza	1	300	Vee	240	100	750	40	4	1190	194	3.94	44.4
Nieuport-Delage 42C1	TrMo	LandMac.	FigS	1	7.50	3.00	No.	12.00	2.30	26.6	Hispano Suiza	1	480	Vee	270	100	7500	40	4	1430	250	3.60	65.0
Nieuport-Delage 44C1	TrMo	LandMac.	FigS	1	7.20	3.00	No.	12.00	2.30	30.9	Lorraine	1	450	"W"	260	100	7200	40	4	1730	250	3.85	56.0
Nieuport-Delage 43HY	TrBi	Convt	Dek-F	2	10.00	3.80	No.	12.80	1.80	44.0	Hispano Suiza	1	480	Vee	200	89	6000	40	4	2200	350	4.58	50.5
Potez 19	TrBi	LandMac.	NigB	3	14.10	4.30	No.	21.30	2.70	112.0	Hispano Suiza	3	900	Vee	187	80	4000	24	4	4730	1000	5.25	42.5
Potez 27	TrBi	LandMac.	Recon	2	8.70	3.40	No.	12.80	2.30	45.0	Lorraine	1	400	Vee	216	80	4000	18	4	1905	400	4.75	42.5
Potez 25	TrBi	LandMac.	Recon	2	9.00	3.50	No.	14.00	2.50	46.0	Lorraine	1	450	"W"	235	80	5000	24	4	1945	400	4.30	42.0
Potez 26	TrBi	LandMac.	FigS	1	8.00	3.15	No.	12.00	2.30	32.0	Lorraine	1	450	"W"	250	90	5000	20	3	1550	240	3.40	48.0
S.E.C.M. BN2	TrBi	LandMac.	NigB	3	14.00	4.10	No.	19.00	3.00	74.0	Renault	1	600	Vee	200	80	5000	45	6	3500	940	5.80	47.0
Wibault A	TrMo	LandMac.	FigS	1	7.20	2.90	No.	11.00		22.0	Jupiter	1	430	Rad	221	88				1277	250	3.10	58.0
GERMAN																							
Albatros L30	TrBi	LandMac.	EleTr	2	7.63	3.15	No.	12.96	1.80	37.50	Mercedes	1	100	Ver	110	60	1000	15	3½	1070	348	10.10	28.5
Albatros L58	TrMo	LandMac.	MailC	7	10.87	3.82	No.	18.00	3.02	34.50	Maybach	1	260	Ver	150	80	2000	30	4	2250	880	8.80	45.0
Albatros L59	TrMo	Convt	Sport	7	5.40	2.65	Yes	10.30	15.00	10.00	Siemens	1	55	Rad	150	90	1000	9	3½	485	132	8.10	48.5
Albatros L60	TrMo	Convt	Sport	2	5.40	2.65	Yes	10.30	15.00	10.00	Siemens	1	77	Rad	165	95	1000	8	2½	600	231	7.50	60.0
Albatros L66	TrMo	Convt	EleTr	2	5.40	2.20	Yes	9.00	1.90	13.50	Haake	1	35	Hor	100	65	1000	15	3	175	175	12.00	29.3
Caspar-Werke CLE16	TrMo	LandMac.	Pas&F	3	6.65	2.20	Yes	12.00	1.6	18.10	Siemens	1	80		163	80	1000	16	4	850	300	10.60	46.9
Caspar-Werke C17	TrMo	LandMac.	Sport	2	5.10	1.90	Yes	12.00	1.30	15.60	A.B.C.	1	25	Hor	115	50	500	8	3	350	180	14.00	22.4
Caspar-Werke CJ14	TrBi	LandMac.	FigS	1	6.45	3.30	No.	8.60	1.30	18.70	Hispano Suiza	1	300		260	98	1000	1	2½	1100	400	3.70	5.8
Caspar-Werke CLE12	TrMo	LandMac.	Pas&F	1	11.27	3.55	Yes	20.00	2.80	52.30	Maybach	1	260	Ver	160	90	1000	16	4½	3000		11.00	58.0
Dornier Delphin	TrMo	FlyingB	Pas&F	6	11.50	3.10	No.	17.10	3.00	49.00	R.R.Falcon	1	260	Vee	157	85	3000	50	4	2300	650	8.90	47.0
Dornier Komet	TrMo	LandMac.	Pas&F	6	10.20	2.70	No.	19.60	3.24	62.00	R.R.Eagle	1	360	Vee	175	85	3500	50	5	2935	1200	8.15	47.2
Dornier Libelle	TrMo	FlyingB	EleTr	3	7.15	2.40	Yes	9.80	1.60	15.50	Siemens	1	77	Rad	145	70	2000	30	3	550	250	11.00	48.0
Dornier Whale	T&PMo	FlyingB	Pas&F	9	16.15	4.30	No.	22.50	4.60	96.00	R.R.Eagle	2	720	Vee	185	85	3500	35	8	5090	1600	17.15	53.0
Dornier Whale	T&PMo	FlyingB	DayB	4	16.15	4.30	No.	22.50	4.60	96.00	R.R.Eagle	2	720	Vee	185	85	3000	30	5	4960	1600	17.15	53.0
Dornier Falke S	TrMo	Seaplane	FigS	1	7.43	2.66	No.	10.00	2.00	20.00	Hispano Suiza	1	300	Vee	253	90	4000	18	3	1350	305	4.40	65.7
Dornier Falke H	TrMo	LandMac.	FigS	1	7.43	2.66	No.	10.00	2.00	20.00	Hispano Suiza	1	300	Ver	260	90	4000	13	3	1210	300	4.00	60.0

ABBREVIATIONS:

Amph—Amphibian
Adv-Tr—Advanced Training
Convt—Either Land Machine or Seaplane
DayB—Daylight Bombing
DekF—Deck Flying
EleTr—Elementary Training
FigS—Fighting Scout
FlyingB—Flying Boat
Hor—Horizontal
LandMac—Land Machine
MailC—Mail Carrier
NigB—Night Bombing
Pas&F—Passengers and Freight
PuBi—Pusher Biplane
RaMa—Racing
Rad—Radial
Recon—Reconnaissance
Rot—Rotary
TorC—Torpedo Carrier
TrBi—Tractor Biplane
TrMo—Tractor Monoplane
TrTr—Tractor Triplane
T&PBi—Tractor and Pusher Biplane
T&PTr—Tractor and Pusher Triplane
T&PMo—Tractor and Pusher Monoplane
Vee—Vee
Ver—Vertical
"W"—Three Row Vee
4"X"—Four Row Vee

Foreign Airplane Specifications—Continued

MAKE AND MODEL	CHARACTERISTICS				GENERAL DIMENSIONS (meters)						ENGINE				PERFORMANCE					WEIGHTS (kilos)			
								Main Wings							Speed (Kilom. Per Hr.)		Climb						
	Class	Type	Designed for	Seating Capacity Including Pilot	Length	Height	Wings of Folding Type ?	Span	Chord	Total Area	Make	Number	Total Horse Power	Type	Full Throttle	Landing	Altitude (M.)	Minutes	Endurance at Cruising Speed (Hrs.)	Fully Loaded	Useful Load	Per H.P.	Per Square Meter of Surface
GERMAN—Continued																							
Focke-Wulf A16	TrMo	LandMac.	Pas&F	4	27.11	.....	No.	42.00	.....	29.10	Siemens	1	75	Rad.	18	60	.....	....	4	940	.....	28.50	7.3
Junkers F13	TrMo	LandMac.	Pas&F	6	9.60	3.30	No.	17.80	3.00	35.75	BMW	1	200	.....	165	80	1000	12	6½	.....	650	.....	19.0
Junkers F13	TrMo	Seaplane	Pas&F	6	9.60	3.30	No.	17.80	3.00	35.75	BMW	1	200	.....	165	80	1000	12	6	.....	550	.....	19.0
Junkers K16	TrMo	LandMac.	Pas&F	3	8.00	2.75	No.	11.00	1.80	45.20	Siemens	1	100	.....	150	85	2000	23	3	.....	250	.....	85.0
Junkers T19	TrMo	LandMac.	Pas&F	3	7.50	2.70	No.	13.00	2.00	19.20	Siemens	1	100	.....	145	80	2000	24	4	.....	350	.....	85.0
Junkers A20	TrMo	Convt.	Sport	2	9.45	3.30	No.	15.27	2.25	28.00	BMW	1	195	.....	175	80	2000	12	8	.....	270	.....	16.0
Junkers U23	TrBi	LandMac.	EleTr	2	7.10	2.65	No.	13.00	2.00	21.20	Rhone	1	120	.....	150	72	2000	28	3	.....	500	.....	82.0
L.F.G. V20	TrMo	Seaplane	Pas&F	6	9.40	3.50	No.	14.40	2.70	36.00	BMW	1	185	Vee	170	80	1000	9	4	.....	660	.....	47.8
L.F.G. VL13	TrBi	LandMac.	Pas&F	5	10.20	3.40	No.	17.50	2.30	71.50	Benz	1	220	Vee	130	80	1000	7	4	.....	680	.....	27.7
L.F.G. V360	TrMo	LandMac.	Pas&F	8	10.50	3.10	Yes	20.00	3.13	60.00	Benz	2	370	Ver	170	75	1000	7	....	2900	990	7.84	48.3
ITALIAN																							
Ansaldo Balilla 1918	TrBi	LandMac.	FigS	1	6.84	2.53	No.	7.60	1.50	21.50	SPA	6	220	Ver	220	100	6000	22	2.30	295	250	4.38	40.8
Ansaldo SVA 1918	TrBi	LandMac.	Recon	2	8.13	2.75	No.	9.18	1.78	27.00	SPA	6	200	Ver	210	90	5000	36	6.00	500	400	6.25	46.2
Ansaldo A300-4 1922	TrBi	LandMac.	Recon	2	8.75	2.97	No.	11.24	1.95	39.56	Fiat	12	300	Ver	200	90	5000	46	3.30	600	500	5.66	43.0
Ansaldo A400 1924	TrBi	LandMac.	Recon	2	8.70	3.12	No.	13.09	1.95	44.60	Lorraine	12	400	Vee	235	90	6000	31½	3.30	800	700	4.66	42.1
Ansaldo SVA10	TrBi	LandMac.	Recon	2	8.10	2.65	No.	9.10	.....	26.90	IF	1	250	Ver	205	110	5000	24	2.15	1110	350	4.40	41.6
Caproni CA3	T&PBi	LandMac.	NigB	3	11.05	3.85	No.	22.74	.....	92.00	IF-V4B	3	570	Ver	137	75	4000	50	4.15	3650	1000	6.40	92.0
Caproni 450	TrBi	LandMac.	NigB	4	11.05	3.85	No.	22.74	2.12	96.00	IF-VB	3	450	Ver	140	70	4000	45	4.00	3600	1000	6.60	37.5
Caproni 1923	TrBi	LandMac.	NigB	4	10.80	4.20	No.	20.72	2.90	100.00	SPA	3	690	Ver	189	88	3000	30	4.00	4400	1700	7.30	44.0
Caproni 450	TrBi	Seaplane	NigB	4	11.28	4.71	No.	20.72	2.90	100.00	SPA	3	690	Ver	160	100	3000	35	4.00	4800	1500	8.70	48.0
Caproni LB4	TrBi	LandMac.	NigB	4	12.50	5.60	No.	25.00	3.25	143.00	SPA	4	820	Ver	182	75	4000	45	5.00	5500	1800	6.70	38.4
Caproni 67	TrBi	LandMac.	NigB	4	12.50	5.60	No.	25.00	3.70	143.00	Lorraine	2	800	Ver	180	75	4000	45	5.00	5300	2000	6.60	37.0
Caproni 1924	TrMo	LandMac.	FigS	1	6.81	2.42	No.	10.00	.....	18.76	Hispano-Suiza	1	300	Ver	277	105	5000	12	3.00	1000	300	3.30	54.0
FIAT BR1	TrBi	LandMac.	DayB	2	10.80	3.90	No.	17.30	2.52	77.00	FiatA14	1	700	Vee	240	95	4000	33	4.25	3875	1500	5.60	50.0
FIAT R2	TrBi	LandMac.	Recon	2	8.54	3.15	No.	12.32	.....	46.50	FiatA126	1	300	Ver	95	175	4000	39	3.00	1700	480	5.67	36.6
FIAT CR1	TrBi	LandMac.	FigS	1	6.19	2.42	No.	8.95	1.53	23.50	HS42	1	300	Vee	272	95	5000	16½	3.00	1155	315	3.85	49.2
Macchi M15	TrBi	LandMac.	Recon	2	8.57	3.37	No.	13.40	.....	42.00	FiatA126	1	300	Ver	190	98	5000	54	3.30	1730	510	5.90	41.0
Macchi Mod.5	PuBi	FlyingB	FigS	1	8.00	2.85	No.	9.70	.....	26.00	IFV6	1	250	Ver	205	90	5000	28	3.40	1080	325	4.32	41.5
Macchi M7	PuBi	FlyingB	FigS	1	8.00	2.85	No.	9.95	.....	26.00	IFV6	1	250	Ver	205	90	5000	28	3.40	1080	325	4.32	41.5
Macchi MF	PuBi	FlyingB	FigS	1	8.09	2.97	No.	9.95	.....	23.50	IFV6	1	250	Ver	200	90	5000	26½	3.00	1098	293	4.30	46.0
Macchi M18	PuBi	FlyingB	Recon	2	9.51	3.27	No.	15.80	.....	45.00	IFV6	1	250	Ver	172	85	4000	31	4.00	1660	475	6.41	37.7
Macchi M24	.....	FlyingB	TorC	4	13.70	4.65	No.	22.00	2.75	90.00	Lorraine	2	800	Vee	200	95	5000	55	8.00	4700	1600	5.87	52.2
Macchi M26	PuBi	FlyingB	FigS	1	7.82	3.00	No.	9.20	1.52	26.00	Hispano-Suiza	1	300	Vee	251	88	7000	57	2.50	1180	330	3.93	45.4
Savoia 12	PuBi	FlyingB	DayB	2	11.50	3.80	No.	15.00	2.20	52.20	Ansaldo	1	450	4"X"	222	120	4000	29	4.00	1600	2400	.....	.....
Savoia S13	PuBi	FlyingB	FigS	2	9.00	3.10	No.	11.00	1.90	32.80	Isotta-Frasch	1	250	Ver	200	110	5000	42	4.00	.....	475	.....	.....
Savoia S16	PuBi	FlyingB	Pas&F	6	9.90	3.60	No.	15.50	2.20	59.10	FIAT	1	300	Vee	165	90	3000	48	6.00	.....	800	.....	.....
Savoia MVT	TrBi	LandMac.	Pas&F	1	7.20	2.70	No.	8.70	.....	42.00	SPA	1	220	Ver	250	100	5000	17	2.00	.....	230	.....	.....
Savoia S51	PuBi	FlyingB	DayB	1	9.90	.....	No.	.....	.....	.....	Hispano-Suiza	1	300	Vee	280	105	5000	27	3.00	.....	320	.....	.....
Savoia S53	PuTi	FlyingB	Pas&F	5	9.90	3.60	No.	15.50	2.20	59.10	Hispana-Suiza	2	260	Vee	150	90	3000	48	4.00	.....	760	.....	.....
Savoia S55	T&PTr	FlyingB	DayB	6	16.00	3.60	No.	.....	.....	93.00	FIAT	2	1220	Vee	150	90	3000	45	4.00	.....	4300	.....	.....
Savoia S56	PuBi	FlyingB	EleTr	3	8.00	2.50	No.	.....	.....	28.00	Rhone	2	220	Rot	130	65	3000	35	4.00	.....	160	.....	.....
Savoia S166	PuBi	FlyingB	DayB	2	9.89	3.67	No.	15.50	.....	53.00	FIAT A12	1	300	Ver	165	95	3000	36	5.00	2420	700	8.07	45.6
DUTCH																							
Fokker D.XIII	TrBi	LandMac.	FigS	1	7.30	2.90	No.	11.50	.....	21.80	Napier	1	450	W	270	....	5000	11	3	1550	430	.....	.....
Fokker D.XI	TrBi	LandMac.	FigS	1	7.30	2.90	No.	11.50	.....	21.80	Hispano Suiza	1	300	Vee	230	....	5000	17	3	1250	315	.....	.....
Fokker C.IV	TrBi	LandMac.	FigS	2	9.00	3.40	No.	12.90	.....	34.50	Napier	1	450	W	250	....	5000	17	3½	2020	620	.....	.....
Fokker C.IV	TrBi	LandMac.	Recon	2	9.00	3.40	No.	12.90	.....	29.00	Napier	1	450	W	240	....	5000	28	5½	2400	950	.....	.....
Fokker C.IV	TrBi	LandMac.	DayB	2	9.40	3.50	No.	14.20	.....	43.50	Napier	1	450	W	225	....	3000	18	6½	2600	1050	.....	.....
Fokker C.IV.W	TrBi	Seaplane	Recon	2	9.00	3.40	No.	12.90	.....	39.00	Napier	1	450	W	220	....	3000	25	6	2600	800	.....	.....
Fokker C.IV.W	TrBi	Seaplane	DayB	2	9.40	3.50	No.	14.20	.....	43.50	Napier	1	450	W	210	....	3000	28	6½	2950	1050	.....	.....
Fokker S.III	TrBi	LandMac.	EleTr	2	8.00	3.10	No.	10.60	.....	25.30	Beardmore	1	160	Ver	165	65	1000	5	3½	1100	300	.....	.....
Fokker S.IV	TrBi	LandMac.	EleTr	2	8.50	3.10	No.	11.10	.....	27.50	Rhone	1	130	Rot	175	60	1000	4½	3½	1000	350	.....	.....
Fokker F.VII	TrBi	LandMac.	Pas&F	10	13.50	3.70	No.	21.50	.....	71.70	Rolls-Royce	1	360	Vee	160	80	1000	14	6	3255	1300	.....	.....
Fokker F.VII	TrMo	LandMac.	Pas&F	10	13.50	3.70	No.	21.50	.....	71.70	Napier	1	450	W	175	80	1000	11	5½	3700	1300	8.60	51.50
Fokker C.V	TrBi	LandMac.	Recon	2	9.00	3.40	No.	12.90	.....	39.00	Hispano Suiza	1	450	W	250	....	5000	17	5½	2050	550	.....	.....
Nationale T.K.33	TrMo	LandMac.	Pas&F	13	17.45	4.75	No.	24.85	5.00	100.00	Siddeley Puma	3	720	Ver	185	75	.....	....	6	5000	3000	7.00	50.00
Nationale T.K.32	TrBi	LandMac.	EleTr	2	7.20	2.90	No.	9.00	.....	.....	Clerget	1	130	Rot	150	62	2600	8	4	.....	.....	.....	.....
Nationale T.K.31	TrMo	LandMac.	Recon	2	7.80	3.10	No.	11.30	2.20	23.00	Jupiter	1	420	Rad	235	70	5000	25	2	1536	486	.....	.....
Nationale T.K.30	TrMo	LandMac.	AdvTr	1	5.78	2.85	No.	8.00	2.20	27.00	Anzani	1	45	Rad	150	55	5000	35	4	2180	980	.....	.....
Nationale T.K.29	TrBi	LandMac.	Pas&F	3	7.60	3.00	No.	10.00	.....	.....	Lucifer	1	100	Rad	160	70	4500	....	4	900	445	9.00	.....
Nationale T.K.23a	TrBi	LandMac.	FigS	1	6.30	1.80	No.	8.20	.....	18.00	Lyrex	1	220	Rad	246	80	6500	22	3½	640	260	2.60	36.00
CZECHOSLOVAKIAN																							
Aero A11	TrBi	LandMac.	Recon	2	8.30	3.10	No.	12.80	1.90	36.88	BMW	1	220	Ver	200	....	5000	30	4	1571	318	6.40	42.50
Aero A22	TrBi	LandMac.	Pas&F	3	8.30	3.10	No.	12.80	1.90	36.88	Maybach	1	260	Ver	200	....	5000	30	4	1548	469	6.60	42.00
Aero A24	TrBi	LandMac.	NigB	3	12.50	4.50	Yes	22.50	2.50	105.00	Maybach	2	520	Ver	....	....	.....	....	5	4000	1072	.....	.....
Vojenska S6	TrBi	LandMac.	DayB	2	8.85	3.51	No.	15.75	1.40	43.00	Maybach	1	240	Ver	186	89	6250	31½	2½	1848	650	7.50	43.00
Vojenska S7a	TrBi	LandMac.	FigS	1	7.08	2.70	No.	10.00	1.40	21.00	Hispano-Suiza	1	300	Vee	235	97	7600	15	3½	1000	298	3.30	48.00
Vojenska S8	TrMo	LandMac.	RaMa	1	8.30	3.45	No.	11.40	1.60	16.40	Napier	1	427	W	360	132	.....	.....	.....	1230	200	2.70	75.00
Vojenska S18	TrBi	LandMac.	EleTr	2	6.70	2.35	No.	10.00	1.00	19.00	Walter	1	60	Rad	105	68	3200	2½	1½	550	190	9.20	29.00
Vojenska S19	TrBi	LandMac.	Pas&F	5	9.00	3.51	No.	15.00	1.50	45.00	Maybach	1	240	Ver	188	90	5000	40	2½	1950	650	8.10	43.50
Vojenska S20	TrBi	LandMac.	FigS	1	7.40	2.70	No.	10.00	1.25	20.00	Hispano-Suiza	1	300	Vee	240	100	7600	15	3½	1050	356	3.50	52.50
Vojenska S24	TrBi	LandMac.	AdvTr	1	6.58	2.62	No.	8.40	1.35	20.00	Hispano-Suiza	1	180	Vee	185	87	4500	2½	2½	880	150	4.70	44.00

ABBREVIATIONS:

Adv-Tr—Advanced Training
Convt—Either Land Machine or Seaplane
DayB—Daylight Bombing
EleTr—Elementary Training
FigS—Fighting Scout
FlyingB—Flying Boat
Hor—Horizontal
LandMac—Land Machine
NigB—Night Bombing
Pas&F—Passengers and Freight
PuBi—Pusher Biplane
RaMa—Racing
Rad—Radial
Recon—Reconnaissance
Rot—Rotary
TorC—Torpedo Carrier
TrBi—Tractor Biplane
TrMo—Tractor Monoplane
TrTr—Tractor Triplane
T&PTr—Tractor and Pusher Triplane
T&PBi—Tractor and Pusher Biplane
T&PMo—Tractor and Pusher Monoplane
Vee—Vee
Ver—Vertical
"W"—Three Row Vee
4"X"—Four Row Vee

Here and There in Foreign Markets

By special arrangement with the Automotive Division, Bureau of Foreign and Domestic Commerce

Farm Tractor Export Grows

WHEEL tractors comprised the largest single item of agricultural machinery exported from the United States for 1924, according to the Agricultural Implement Division of the Department of Commerce. In all the exportations amounted to $13,178,332. This was an increase of 17 per cent over the value of wheel tractors exported in 1923. Exports of track-laying tractors in 1924 amounted to $1,491,639, which was an increase of considerably less than 1 per cent over 1923. Garden tractors decreased from $60,267 in 1923 to $57,187 in 1924.

Australian Motor Show

THE Royal Automobile Club of Victoria and the Australian Chamber of Automotive Industries are acting in conjunction in the making of arrangements for the international motor show to be held in Melbourne, in May, 1925. Provision of 72,000 square feet is being arranged for. The secretary in charge of the arrangements is H. W. Harrison, Chamber of Automotive Industries, Elizabeth House, Elizabeth Street, Melbourne.

Fiat Invades Rumania

ESTABLISHMENT of a branch in Bucharest, Rumania, of the Fiat Company, Italian, is reported by Acting Commercial Attache Louis E. Van Norman at Bucharest. He says this is indicative of the efforts being made by this firm to oppose the popularity of American cars in this market. Among the other foreign makers active in Rumania are Renault and Citroen, French.

Sweden May Revise Duties

A REVISION of duties on automobiles and automobile parts taken into Sweden for assembling, in order to promote importation of the latter, is being considered by the Riksdag, says a report from Trade Commissioner T. O. Klath at Stockholm. This is one of a number of proposals providing for changes in Swedish import duties which have been presented to the Riksdag.

New Roads in Italy

A NUMBER of special automobile roads between Milan and the lake resorts in northern Italy have been completed recently. These roads have a concrete pavement 8 in. thick, with a thin layer of asphalt on top to make them absolutely dustless. There are no level crossings of any kind. Some of these roads are 36 ft. wide, others 48 ft. These roads are toll roads and vehicles with other than elastic tires are not permitted on them. The total length of these roads is about 50 miles and the cost of construction approximated 75,000,000 lire (about $3,200,000).

Outlook Good in Finland

FINLAND'S prospects for the first quarter of 1925 are not indicative of any outstanding change although a large turnover is expected during the current year, particularly in trucks, truck chassis and buses. There is a slight tendency to purchase higher priced cars, but business in the lower priced cars is expected to increase substantially. The general state of the automotive trade for the first eleven months of 1924 was the most satisfactory ever known in Finland.

Greek Market Active

THE Automotive Division of the Department of Commerce is advised in a cable dispatch from the Assistant Trade Commissioner at Athens that a record number of 1161 automobiles were imported by Greece during the first eleven months of 1924, as compared with 428 cars, the figures for the entire year of 1923. It is of special interest to note, says the dispatch, that approximately 75 per cent of the imports were cars of American manufacture.

Czechoslovakia Increases Allotment

THE contingent of American automobiles allotted to be imported into Czechoslovakia from the United States during 1925 has been increased from 400 to 500, following a similar increase in the number of French automobiles allowed, say cable advices to the Department of Commerce. The increase in cars from the United States is a result of the most favored nation provision in the modus vivendi between the two countries.

Port of Santos Clogged

TOWARD the end of February there were 4500 American automobiles at Santos, Brazil, awaiting shipment to the assembling plant at Sao Paulo, which closed for a time due to lack of materials. The United States led in the automobile imports into Santos in January, followed by Italy and England. The tire market is very active, and one large American company had the largest sale in its history during January.

EDITORIAL

War Taxes

PROSPECTS for further reduction in war taxes levied against the automobile industry seem fairly good at the present time. While a long fight undoubtedly lies ahead, it is encouraging to note that President Coolidge, in his inaugural address, not only stressed the need for economy, but specifically stated that "We no longer need war time revenues."

Economic justification does not exist for continuance of luxury taxes on automobiles, trucks and parts. A year ago the industry won part of its battle to have these levies removed. Much still remains to be done. Continued emphasis of the unjustness of the taxes and of the utility function of the motor vehicle will help to convince members of Congress that further tax reductions should be made.

Credits and Sales

IN an era of intense competition a period of expanding business brings with it need for caution as well as for added sales effort. A prominent automotive financier pointed out the other day, for instance, that as business gets better—as he expects it will during 1925—credits will be easier. As a result, he sees a danger of automobile dealers taking advantage of that condition to extend even longer credit terms than have been common in the past.

Such a development, he believes, would not be sound. He is thoroughly in favor of the limitation of time sale payments to a period of a year as advocated by the association of finance companies recently formed in Chicago. He does not have any great fear that an unsound situation will develop, but considers the point worth stressing. We are passing it along.

Standards and Patents

IN the past the S. A. E. in its standardization work always has endeavored to steer clear of patented articles, the invariable rule having been that if a device was patented it was not a proper subject for standardization. Recently, however, there seems to have been a change of heart on the part of the Standards Committee and a new policy is about to be inaugurated.

The reasoning back of the former policy probably was that if a device was covered by a patent and therefore controlled by a single firm, any standardization required could readily be accomplished by that firm without outside assistance. Another and probably even weightier reason was that if the device came into competition with other products, its standardization by the S. A. E. was likely to be regarded by possible users as an indorsement, and manufacturers of competitive devices therefore more or less naturally frowned upon such standardization. In fact, for a long time it was felt that any attempt to standardize patented and proprietary articles was a direct bid for trouble.

What probably led to the contemplated revision of the S. A. E.'s attitude in the matter is that in some cases methods or devices were standardized, and then some one came along with an alternate method or device which he claimed to be an improvement and upon which he proceeded to secure patent protection; then, in trying to introduce it on the market he would encounter difficulty from the fact that he was trying to replace a standard. There then appeared to be some justification for the charge, often made, that standardization hampers progress. This charge could be met only by standardizing the new method or device and giving it the same recognition as the old one.

Certain precautionary measures must necessarily be taken when standardization of articles covered by patent rights is undertaken. Designers must be warned that they are not free to make and use the article merely because it is an S. A. E. standard, and the S. A. E. also must cover itself against possible charges of having encouraged infringement of patent rights. When these points are attended to, the extension of standardization effort to certain subjects covered by patent rights evidently is a step in the right direction.

The Open Car

SOME executives have begun to feel that the heavy publicity given closed cars in recent months has grown to a point where the open model isn't being taken as seriously as it should be.

Without denying the strong trend to closed jobs, these men think the time has come to rise up and state that the open car is far from being a thing of the past. One large company, for instance, has had to increase its open car schedules several times in the last few months simply because the current demand for open types had been underestimated.

The strong emphasis that has been placed on closed cars is being felt in the used car market, where open jobs aren't bringing nearly as good a price as they might if less were said about such models being passè. Less than 40 per cent of all the cars built last year were closed. That means that something like 1,600,000 open cars were built and sold in 1924.

Open cars will be a very important factor in the used car market, as well as in the new car field, for many, many years. The situation shouldn't be complicated by too much public emphasis on closed types.

Our Industry Today—

American Manufacturers Consider Foreign Trade Financing—Surveys Indicate Further Production Increases

NEW YORK, March 9—Financing of foreign automotive sales on a well organized world-wide scale is receiving the attention of American manufacturers, now that schedules for meeting the 1925 American demand have been mapped out. Some men in the automobile field have figured that by ten years from now foreign countries will be taking about one-fourth of the motor vehicles made in America. To bring this about as soon as possible a move is being made to form a strong financing body. The trade abroad is beginning to grow at a more rapid pace than it has in the past. South America, especially, has loomed into view as a lucrative field. Plans for this wholesale foreign invasion probably will have been fully formulated by the time of the next World Motor Trade Congress, which the National Automobile Chamber of Commerce has decided to hold in New York Jan. 11 to 13, 1926.

March production in the United States is going forward on an increased scale just as it did in January and February. The latter month showed an increase in output of 15 per cent over January. If, as at present indicated, the figures at the end of the present month show an increase over February something like that developed by the latter month over January, an output for the year in excess of that for 1924 will be assured.

Manufacturers who have completed their survey of conditions before mapping out their schedules for the second quarter report that prospects are much better than at the same time a year ago.

In the Middle West, where farmers have become much more prosperous, sales have been good this year. Denver reports that the Rocky Mountain territory, with the revival of silver mining and larger crop payments in the sugar beet growing sections, is experiencing one of the most prosperous eras in its history.

In the New England district, and in fact, throughout the East, sales are being made on an enlarged scale as the weather opens up.

AUBURN REPORTS GOOD YEAR

TOLEDO, March 11—J. I. Farley was reelected president of the Auburn Automobile Company at the annual stockholders' meeting held recently in Auburn. In a review of the past year's operations given at the meeting Mr. Farley reported business at the close of the year as the most satisfactory since 1920. Financially, he said, the company is in fine condition.

SPICER 1924 REPORT

NEW YORK, March 11—For the year ended December 31, 1924, Spicer Manufacturing Co. shows a net profit of $968,835, equal after preferred dividends to $2.32 a share on the common stock, as compared with $1,075,673, or $2.66 a share in 1923.

Detroit Sales Show Open Car Decline

Closed Cars Hold Up Well in Record for January and February

DETROIT, March 10—Retail sales in Detroit for the first two months of the year totaled 6824, as against 8779 in the first two months of 1924. The falling off was mainly in open cars, which fell from 3003 to 1761, the closed car comparison showing 5776 in 1924 as against 5063 in the present year. Closed car sales in these first two months this year were in ratio of three to every open car sale; in 1924 the ratio was less than two to one. In all but the low-priced lines closed car sales far outnumbered open, the Hudson-Essex total showing 728 closed sales to four open.

Ford deliveries for the first two months were 2910, or 43 per cent of the total, comparing with 4607, or 52 per cent of the total in the first two months of 1924. All low priced lines including Ford sold 3508, or 50 per cent, of the total, as against 5668, or 64.5 per cent last year. Combining these with lines selling in the $1,000 price class, the total sales were 4690, 70 per cent of the total, as against 6748, or 77 per cent of the total in 1924.

Sales in the medium price class totaled 1382, or 27 per cent of the total business in January and February this year, which compares with a total of 1684, or 19 per cent, in the first two months last year. Sales of cars in the higher price classes show a fractional falling off.

A comparison of open and closed car sales by price classes in the first two months of the year shows 1303 open to 2205 in the low priced lines; 112 to 1070 in the $1,000 price; 315 to 1561 in the medium price, and 22 to 212 in high priced cars. These comparisons are made in the makes enjoying general sale here.

Truck sales in the first two months were 917, as against 1076 in the first two months of 1924. Light truck sales predominate, Ford alone approximating 66 per cent of the total business, with Dodge and Reo holding high places.

Ford Adds Stake Body to Truck Equipment

DETROIT, March 9—The Ford Motor Co. has added a stake body to its one-ton truck equipment, and distribution has begun through its dealer organization. The list price on the truck complete with the new body is $560.

Except for floor and rack boards, which are of wood, the body is all steel. The floor space is 60 in. wide and 98 in. long, and the sides are 26 in. high. The racks are in five sections, two on each side and one at the rear. The sections are held together by steel stakes, the ends of which fit into sockets cut into the outer steel frame of the platform. The list price includes an all-steel cab.

The new body meets many commercial requirements and also fits the needs of the truck gardener and the farmer, provisions having been made for the use of cattle or grain sides on it.

Will Feature Selling at World Motor Congress

NEW YORK, March 10—Successful methods of selling automotive products will be visually presented and an international exchange of experiences facilitated among delegates who are expected to attend the World Motor Trade Congress, which will be held here Jan. 11 to 13, 1926.

Illustrated addresses will be given on sales organizations, promotional activities and the service aspects of selling. John N. Willys is chairman of the Foreign Trade Committee of the National Automobile Chamber of Commerce, under whose auspices the conference will be held.

Automotive representatives who are interested in motor trade or activities pertaining to expansion of automotive transportation in countries outside of the United States will be invited to take part in the conferences and to present plans that have profitably been carried out in their particular countries. The date selected will allow for visits by guests from abroad to the National Automobile Show, attendance at the banquet of the N. A. C. C., and participation in miscellaneous events of manufacturers and allied associations who contemplate cooperation in the congress.

Sees Car Industry Great Rail Feeder

Automobile Expansion Helped Railroads, J. S. Marvin of N. A. C. C. Tells Coast Dealers

NEW YORK, March 11—"The manufacture and use of motor cars create such an immense traffic for the railroads that their recent prosperity is in no small degree attributable to the expansion of the automobile industry," said J. S. Marvin, assistant general manager of the National Automobile Chamber of Commerce, addressing a large gathering of automobile dealers in San Francisco recently. "Based on the statistics of the Interstate Commerce Commission for the first nine months of 1924, 726,000 carloads of finished automobiles and parts were shipped during the year.

"Tire shipments are placed at 50,000 carloads.

"Of the 7,780,625,085 gallons of gasoline consumed in this country in 1924, 80 per cent, or 6,225,000,000 gallons were for automobile use. After allowing for local deliveries from refineries the shipping of the balance is estimated at tank car loads, 640,000.

"If complete segregated data on this whole question were available it is thought 2,000,000 carload shipments could be credited as the annual contribution to the rail carriers through the manufacture and use of automobiles. There are no assembled facts whatever covering the thousands of small less than carload and express shipments."

New Paige Brougham Will Sell at $2,195

DETROIT, March 10—The Paige Detroit Motor Car Co. is now in production on a Paige standard brougham, priced at $2,195, which is $30 more than that charged for the touring car. The body conforms to the de luxe brougham type recently added to the line, except that much of the special equipment is omitted. The car is finished in green zapon with black enameled radiator. It includes as equipment trunk, combination stop and tail light and windshield wiper.

VULCAN AXLE CO. SOLD

DETROIT, March 10—Property of the Vulcan Motor Axle Co., consisting of material, equipment and machinery has been sold for $23,000 to the Automotive Industries Co. of Chicago. The property was appraised at $43,000. The sale was held by Security Trust Co. as trustee in bankruptcy, and was confirmed by the referee in bankruptcy.

Vulcan Motor Axle Co. went into bankruptcy in December last with creditors' claims amounting to $300,000. The plant of the company was leased from the Miami Realty Co.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, March 11—Fluctuations in industrial and trade activity are irregular. Current reports indicate that hand-to-mouth buying is still prevalent, and that the anticipated spring revival is so far less pronounced than was expected in some quarters. Interest rates and general commodity prices were higher last week.

The production of pig iron last month was the highest February figure ever recorded, the total being 3,214,143 tons, as against 3,370,336 in January and 3,074,757 in February last year. The average daily output was 114,791 tons, comparing with 108,720 in the preceding month and 106,026 a year earlier. Last month's output of steel ingots was 3,740,004 tons, which compares with January's revised figure of 4,180,413 and 3,809,185 in February last year, while the daily average, the highest since last March, was 155,833 tons, as against 154,830 in January and 152,367 in February, 1924.

Car loadings in the week ended February 28 (a holiday week) numbered 862,910, comparing with 925,295 in the preceding week and 945,019 in the corresponding period last year, which did not contain a holiday. Loadings in the first nine weeks of 1925 were 1.8 per cent in excess of the corresponding 1924 figure.

Production of crude petroleum in the week ended February 28 averaged 1,943,750 barrels a day, which compares with a daily average of 1,947,600 barrels in the preceding week and 1,884,900 in the corresponding period last year. The world's production of crude oil in 1924 is estimated at 1,013,139,000 barrels, as against 1,018,900,000 barrels in 1923. Of this total the United States produced 714,000,000 barrels, or 70.5 per cent, compared with 732,407,000, or 71.9 per cent in the preceding year.

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended March 4 were 24.4 per cent more than the total for the preceding week (a holiday week), and 12.7 per cent above that for the corresponding period last year.

Fisher's index of wholesale commodity prices stood at 164.1 last week, comparing with 163.1 for the preceding week and 162.3 a fortnight earlier. Dun's monthly index for March 1 shows a decline of 1.3 per cent during February.

Goodyear to Resume Preferred Dividends

$1.75 Quarterly Voted on Stock That Has Passed Payments for Four Years

NEW YORK, March 11—The directors of the Goodyear Tire & Rubber Co. voted today to resume dividends on the preferred stock, which has gone without payments for four years. The dividend is $1.75, payable April 15 to stock of record March 23, and is on a quarterly basis. As of Dec. 31, 1924, there are 29.75 per cent of back dividends due on the stock, which has a cumulative feature, the sum due amounting to about $19,500,000.

The directors have had under consideration a plan for settlement of the accumulated dividends by the issue of additional common stock in lieu of cash, an official statement after the meeting declared. Owing to inability to secure full accord among all those whose cooperation was deeded essential, the board has voted not to proceed with its plan for the present, but will hold it in abeyance while further negotiations are conducted.

LEE TIRE SALES GAIN

NEW YORK, March 11.—The Lee Tire and Rubber Co., for 1924, showed a net loss of $234,472 for 1924, but net sales were $12,586,370, as compared with $9,397,000 in 1923. John J. Watson, president, said the report reflected the expense involved in the unification of the two subsidiary companies, the Lee Tire and Rubber Co. of New York and the Republic Rubber Company of Ohio.

TIMKEN REPORTS EARNINGS

NEW YORK, March 11—The Timken Roller Bearing Co., in its statement for 1924, reports net profits after depreciation and tax reserves of $5,805,687, or $4.83 a share on its capital stock as against $8,096,803, or $6.74 a share the preceding year. The net quick position is strong, current assets amounting to $15,342,210 as compared with current liabilities of $842,455.

HAYES WHEEL PROFITS

NEW YORK, March 11—The Hayes Wheel Co. for 1924 reports sales of $15,366,492, against $19,737,725 in 1923, and net profits of $715,264, equal to $3.16 a share, as compared with $1,302,066, equal to $6.60 a share in 1923.

CHANDLER BUSINESS GAINS

CLEVELAND, March 11—Directors of the Chandler Motor Car Co. were reelected at the annual meeting. F. C. Chandler, president, said that business gained materially in the latter part of February, after a period of slump.

Discuss Standards for Auto Frames

Swab Tells S. A. E. Members Car Frames May Be Put in Size Groups

MILWAUKEE, WIS., March 11—L. C. Swab, assistant production manager of A. O. Smith Corp., gave a paper on Standardization of Automobile Frames at the S. A. E. Milwaukee Section meeting here March 5. He described a large new press the company has had built which will form the largest truck rail or bus rail in one stroke of the press. The press has a die space of 35 by 4 ft. and its chrome nickel steel crankshaft is 16 in. in diameter.

In the paper it was shown that passenger car frames may be divided into size groups. For instance, one group of six varies in length from 152 to 157 in.; the front drop on these frames varies from 4½ to 6 in.; the number of cross bars is either 3 or 4, and the front widths of the frames vary only about 1½ in. These frames are those of medium priced cars such as the light six Nash, Dodge, light six Buick, Maxwell, Hupp, etc. All the more important dimensions are very close together yet far enough apart to make it necessary to tool up specially for each.

On trucks simpler frames are used. The only important variation is in respect to length, which can be readily handled by merely adding to the punch and die wall.

A moving picture was shown of the new frame plant of the A. O. Smith Corp. in which all operations are automatic as far as possible. It was said that the material is hardly touched by workmen from the time it enters the plant to the time it comes out at the other end a complete frame.

The machine has a capacity of 6 complete frames per min. or 3600 per working day of 10 hr. Answering a question as to the smallest run that it would pay to put on this machine, Mr. Swab said that they would hardly be justified in contracting for runs of less than 8000 frames, although they were prepared to turn out much smaller orders in their old plant.

FINDS ENGLISH ROADS GOOD

WASHINGTON, March 11—America has little to learn from Great Britain in the matter of road construction, highway financing and other problems relating to the development of the automobile, according to A. B. Fletcher of the U. S. Bureau of Public Roads who has just returned from traveling over the rural roads of England, Scotland and Wales. He reports that on the whole the average rural English road is much better than our country roads, but the equal of our best roads is not to be found in that country.

U. S. Traffic Survey Started by British

WASHINGTON, March 11—Survey of the traffic laws and courts of the United States has been begun by the British government in an effort to find a way to deal effectively with increasing traffic accidents and reckless automobile drivers. The survey will be conducted by the British embassy here, which will ask the cooperation and assistance of American officials.

There has been, says Sir Esme Howard, British ambassador, a great increase in recent years of automobile traffic in Great Britain and a consequent growth of congestion in the public thoroughfares. The British government is taking under careful consideration the question of how to guard against accidents and how to "deal effectively with those individuals who are inclined to violate the laws by reckless driving or in other ways."

Request has been made for information on traffic laws and courts in large American cities.

Standardization of Silent Chains and Sprockets Urged

NEW YORK, March 11—The joint committee on the standardization of transmission chains and sprockets, which contains representatives of the S. A. E., A. S. M. E. and the American Gear Manufacturers Association, has recommended that its personnel be increased and its work be broadened into a regular sectional committee under the procedure of the American Engineering Standards Committee, functioning under the joint sponsorship of the three organizations.

This recommendation has been approved by the American Engineering Standards Committee. The scope of the project which the societies will carry forward under the regular sectional committee organization has been tentatively drafted as follows:

"Formulation of American standards for transmission roller chains and sprockets teeth based on the standards already adopted by the Society of Automotive Engineers, the American Society of Mechanical Engineers and the American Gear Manufacturers Association; and the study of the possibilities of standardizing the so-called silent type of transmission chains and sprockets."

CHEVROLET INCREASES PRODUCTION SCHEDULE

DETROIT, March 11—February production of Chevrolet Motor Co. was 26,202 cars. On Feb. 28, 92 per cent of dealers reporting had deposits on order for 26,940 cars which represented unfilled orders carried over into March. Schedule for this month has been placed at 37,500 cars. February output last year, including Canadian plant was 30,819 cars.

British Are Active in Foreign Trade

Increasing Demand Reported for Light Cars—Production Speeded by Makers

LONDON, March 3 (*by mail*)—It has been stated that the monthly output of British factories is now equal to a year's pre-war production. The Morris output is now 1200 per week, the Austin 500, while five other British makes aggregate about 800 between them. Midland machine tool makers report increasing business, and this is mainly attributed to the demands of the motor industry.

Leyland Motors, Ltd., reports a net profit on last year's workings of £90,499, as against a net loss of £4,803 the previous year.

Several Coventry firms are taking steps to secure adequate foreign representation and establish sufficient stocks of spare parts abroad. Increased demand is being experienced for light cars from India, Australia, New Zealand and Japan.

Activity prevails in motorcycle sales, but the existence of too many weak firms has something of a demoralizing effect, keeping prices very low.

Big Turnout at Opening of Boston Motor Show

BOSTON, March 10—Heavy attendance marked the recent opening of Boston's 23rd motor show. During the afternoon more than 10,000 filtered in, and there were twice that number at night. Dealers are enthusiastic, declaring that the spirit shown by the visitors gives every indication of excellent business as a result of the show. There are fifty makes of cars listed at the show, and accessory exhibitors number more than 200. Fine weather at the opening proved a stimulus to the urge to purchase new cars.

RUB-TEX BUYS PREMIER PLANT

INDIANAPOLIS, March 11—Rub-Tex Products Company, which has factories here and in Newcastle, Ind., has taken a fifteen-year lease on a part of the huge Premier plant of this city and will install machinery for the making of battery boxes, rubber mats, etc., for the expansion of its business. Along with the Premier building it has leased also six acres of adjoining land for operation and future expansion. It is expected that when the new additional plant here is ready the Newcastle factory will be given up, although no definite announcement of this was made when the local expansion plans were related by E. H. Emrick, president of the Rub-Tex company.

Production of Tires Speeded at Akron

Sudden Spurt of Orders, Especially for Balloon Tires, Is Reported

AKRON, March 10 — Business of Akron tire plants during the first two months of the year has been of greater volume than in any similar period for the last five years, and indications are that March will be another record-breaking month for the industry.

A sudden spurt in orders for spring and summer delivery of all types of tires, especially in the balloon tire field, has developed from dealers in all parts of the country, according to sales managers here.

The majority of rubber factories in this district are increasing daily tire production right along and are hiring additional workers. Officials of several companies report that they are unable to fill all of the entire quota asked for by dealers for immediate delivery.

The motor car manufacturers have increased their requirements for original equipment tires, it is reported. Contracts signed with Ford, General Motors, Dodge Brothers, Willys-Overland, Studebaker and others call for increases in tire shipments of from 20 to 30 per cent.

Practically all the larger factories in the Akron district are working night and day, with three shifts in operation. Many plants have been gradually adding to their working forces, as production climbed.

The new production schedule, which became effective Monday (March 9) at the Goodyear Tire & Rubber Co., calls for the manufacture of 33,000 tires and 45,000 tubes a day. This represents an increase of about 3000 casings and 5000 tubes a day, or approximately 10 per cent over former schedules.

Experienced Men Hired

During the past month Goodyear has hired 1000 additional rubber workers. The company's personnel has been added to gradually, only experienced men being employed, except in rare instances. Adherence to this policy has eliminated the expense attached to "breaking in" large numbers of inexperienced workers.

If production continues at the present rate, sales of Goodyear products will amount to more than $160,000,000 in 1925. Combined sales of the Akron, California and Canadian companies in 1924 were 138,777,190.

Firestone to Increase

The Firestone Tire & Rubber Co., which is probably the largest single producer of automobile tires in the world, is planning to increase its production from approximately 36,000 tires a day 38,000 in the near future. Additional equipment is being installed to provide for this increase.

Harvey S. Firestone, president of the company, predicts that 1925 will be one of the best years in the history of the rubber and automobile industries. He anticipates a growing demand for cars and tires.

The B. F. Goodrich Co. is manufacturing 25,000 tires a day and 33,000 tubes, the company's production schedules having been steadily increased since the first of the year. Goodrich also reports large sales in rubber parts which go into the manufacture of automobiles.

The Miller Rubber Co., General, India, Seiberling and the smaller companies in this district are operating close to capacity, with day and night shifts.

Best Tractor May Absorb Holt Manufacturing Co.

SAN FRANCISCO, March 10—First step in what is generally considered the absorption of the Holt Manufacturing Co. by the C. L. Best Tractor Co. was taken early in March, when control of the Holt corporation passed to a group of San Francisco capitalists, consisting of Peirce, Fair & Co. and their associates, including virtually all the members of the Holt family, M. M. Baker of Peoria, Ill., and the Benjamin Holt Corp., which, hitherto, has held control of the Holt Manufacturing Co.

Henry Fair of this group is one of the largest stockholders, if not the largest, in the C. L. Best Tractor Co., and has been the guiding influence under whose business direction this company has had a rapid development within the past five years.

At a meeting of the board of directors of the Holt Manufacturing Co. subsequent to the above transfer of control, Thomas F. Baxter, for the past five years president of the company, resigned, and was succeeded by Charles L. Neumiller, unanimously elected to the office. Control of this company, which for 33 years rested in the Holt family, and more recently in the Benjamin Holt Estate Corp., has passed to the new group completely with the installation of Neumiller as president.

URGED FOR SHOALS BOARD

WASHINGTON, March 11—John C. McKinzie, former Congressman from Illinois, was recommended to President Coolidge this week to be chairman of the special Muscle Shoals Commission which the executive plans to appoint. With Congress turning down the Underwood bill by sending it back to conference for a second time, the non-partisan commission, it is hoped, will help untangle the Muscle Shoals situation.

Congressman Almon of Alabama, who represents the Muscle Shoals district in Congress, made the recommendation of McKinzie to the President. He also urged Mr. Coolidge not to permit even a temporary lease of the Muscle Shoals dam until Congress has acted upon the entire question.

Tells of Air Brake of Unusual Design

Metal-to-Metal Brake Burns Off Surface Oil, S. A. E. Members Told

DETROIT, March 11—At the S. A. E. Detroit Section meeting held here March 5, a paper on air brakes was read by H. D. Hukill of the Westinghouse Air Brake Co., and a paper on the Vacuum Booster Brake by Caleb Bragg.

The brakes described by Mr. Hukill are of the metal-to-metal type and in answer to a question he stated that the steel of the shoe contained 0.70 per cent carbon and a little nickel. The liner in the drum is of mild steel containing between 0.10 and 0.20 per cent of carbon.

Mr. Hukill in reply to another question said that a small amount of oil on the surface of the brakes causes no particular trouble, as the first application of the brakes burns it off. Of course, if there were a continuous flow of oil into the brakes, as from a leaking hub, comparatively high pressure would have to be put on the brake to burn through the oil.

To operate four wheel brakes on a 2500 lb. car would require an air brake weighing with accumulator between 50 and 60 lb. If the pressure chamber were also weighed the weight would be increased by about 25 lb. Mr. Bragg said that his model vacuum brake for that type of car weighed only about 22 lb.

With a pressure accumulator there has been some trouble from freezing—more in the line between the accumulator and the reservoir than at the valves, but there has been no such trouble where an air compressor is used.

In passenger car work, the air compressor is recommended for factory equipment, while for individual equipment the pressure accumulator is recommended, Mr. Hukill said.

TOURING COUNCIL FORMED

PARIS, March 2 (*by mail*)—With the object of stimulating and facilitating international travel by automobiles and other means, the Central Council of International Touring was formed at Paris recently by delegates united from 25 different countries. The council, which elected M. Edmond Chaix as its president, will have its headquarters at Paris, but its general assemblies may be held in any country.

The United States Government was represented at the preliminary meetings by Chester Lloyd Jones, commercial attaché. The delegates attending on behalf of the American Automobile Association were Rene Dumesnil and W. F. Bradley, and for the Automobile Club of America, W. S. Hogan and Colonel F. Drake. Both the A. A. A. and the A. C. A. were elected founder members of the new international association.

1924 Was Good Year for Mack Trucks, Inc.

Profit $17.95 a Share on Common Stock—Sales and Surplus Gained

NEW YORK, March 11—Mack Trucks, Inc., and subsidiaries, report a net profit of $6,220,272, after depreciation and Federal taxes, for the year ended Dec. 31, 1924, as compared with $7,003,665 in 1923. Deducting preferred dividends, the earnings were equal to $17.95 a share on 283,109 shares of common stock of no par value.

Sales last year were $46,622,621, as compared with $43,866,957 in 1923. The surplus, after preferred and common dividends, was $3,383,868, as against $4,425,774 in 1923.

The consolidated balance sheet as of Dec. 31, 1924, shows a very strong position, in part the result of the conservative dividend policy of the company, which is paying only $6 a share on the common stock and reinvesting a large part of its earnings. The surplus grew from $18,076,423 in 1923 to $21,355,580 at the end of 1924. Plant extensions were made on a considerable scale during the year covered by the report.

Accounts and notes receivable stood at $13,679,092 at the end of 1924, as compared with $8,994,270 at the end of 1923, reflecting Mack's policy of financing time purchases by dealers. Inventories stood at $16,917,556, as compared with $15,374,316 in 1923.

BUYS COVERT GEAR PLANT

BUFFALO, March 9—The plant of the Covert Gear Co. at Lockport, N. Y., manufacturer of automobile parts, was sold today in a mortgage foreclosure sale to Alwin A. Gloetzner of Lockport, former president and general manager of the concern and later the trustee for the receiver. The sale was made by Thomas H. Penney, Jr., assistant United States district attorney, acting as special master for the receiver. The plant sold for $36,000, subject to liens totaling $103,000.

Mr. Gloetzner has Buffalo, Boston and Chicago bankers interested in the financial reorganization of the firm, which went into receivership after it had merged with seven other companies into the Associated Motors, Inc.

HIT DRIVERS IN MURDER CASES

NEW YORK, March 10—Licenses of drivers figuring in homicide cases will be automatically suspended, even if they are found not guilty of manslaughter in court, under a recent interpretation of the State motor vehicle law by the New York State Motor Vehicle Bureau. Licenses so suspended will not be restored until after an independent investigation by the bureau.

Stoughton Gets New Capital; Activities to Be Broadened

STOUGHTON, WIS., March 11—Plans for a material increase in the output of motor trucks, coaches and buses, and a quantity production of steel dump body trucks are being completed by the Stoughton Wagon Co., a pioneer wagon manufacturing concern, which for several years has concentrated on automotive vehicles. Local capital has absorbed a new issue of $75,000 preferred and common stock to finance the enlargement, and orders have been placed for additional machinery, tools, etc.

In line with plans for local industrial expansion, the city of Stoughton will issue bonds of $100,000 to purchase the abandoned plant of the reorganized Moline Plow Co. and set aside the steam generating plant, to be enlarged, as a municipal light and power plant. The Stoughton Wagon Co. plans are dependent to an extent upon a more adequate supply of electrical energy by the municipality.

Motor Vehicle Utility to Be Topic at I. C. C.

NEW YORK, March 11—The place of the motor vehicle as an economic utility will be the chief theme of the program developed by the motor transport section of the American Highway Association of the International Chamber of Commerce for presentation at the meeting of the chamber, to be held in Brussels next May. This was decided at a meeting of the American Highway Committee, held here March 5. Roy D. Chapin, who is chairman both of the highway committee and of the motor transport section, presided.

It is probable that the American committee will prepare a report which will be sent out in advance of the meeting.

On Saturday, March 7, Mr. Chapin sailed for Europe, where he and John N. Willys and George N. Bauer, foreign trade secretary of the N. A. C. C., will represent the National Automobile Chamber of Commerce at various meetings, as well as at the conference of the International Chamber of Commerce.

BUSINESS BETTER IN CLEVELAND

CLEVELAND, March 10—Business is picking up here. There were 455 more men on pay rolls of plants on Feb. 27 than there were on the last day of January. Thirty-eight of 100 plants here plan to increase their pay rolls during March. Seventy-one of the 100 plants surveyed by the labor relations committee of the Chamber of Commerce worked 49.3 hours per week during February. This is the largest number of hours per week worked since the spring of 1924. The trend of wages is upward. Automobile and automobile parts manufacturers reporting to the chamber increased their employees during February.

Packard Advances Prices on Eights

New List Shows Increases of $100 to $150—Balloons Standard Equipment

DETROIT, March 11—Price increases of $100 to $150 have just been made effective by the Packard Motor Car Co. on its eight-cylinder models. It is also announced that balloon tires, size 33 by 6.75 in., are now standard equipment. The new and old prices on the Packard eight-cylinder line are as follows:

	New	Old
136 in. Wheelbase		
Touring	$3,750	$3,650
Sport Touring	3,900	3,800
Roadster	3,950	3,850
4-passenger coupe	4,650	4,550
5-passenger coupe	4,820	4,725
5-passenger sedan	4,750	4,650
5-pass. sedan limousine	4,850	4,700
143 in. Wheelbase		
7-pass. sedan limousine	5,100	4,950
7-passenger touring	3,950	3,850
7-passenger sedan	5,000	4,800

There are no changes in prices for the six-cylinder models. Recently the Packard company announced the inclusion of several new equipment items in its line, including the Bijur chassis lubricating system and the Skinner oil rectifier, which were covered by the list prices.

Peerless Makes Cut on All 8-Cylinder Models

CLEVELAND, March 11—Substantial price reductions on all Peerless Equipoised Eight models have been announced by Edward Ver Linden, president and general manager of the Peerless Motor Car Co. Effective as of March 7, the new prices will mean reductions of from $340 to $580 on this model.

The old and new prices on the eight-cylinder line are as follows:

	New	Old
4-passenger phaeton	$2,945	$3,285
7-passenger phaeton	2,990	3,365
4-passenger coupe	3,545	3,950
5-passenger coupe	3,595	4,175
5-passenger sedan	3,895	4,250
7-passenger sedan	3,995	4,450
7-passenger limousine	4,195	4,275
Chassis	2,600	2,885

In making public this statement, Mr. Ver Linden said that the reductions would in no way affect the quality of Peerless cars.

DALY HEADS LIBERTY BANK

NEW YORK, March 11—C. F. Daly, vice-president and director of Durant Motors, Inc., has been elected president of the Liberty National Bank of New York. He is a director in a number of other corporations and was for many years vice-president of the New York Central Railroad System. He has been a director of the Liberty Bank since its organization.

Poland Looks Ahead to Car Production

200 Concerns Already Making Parts, and Complete Autos May Soon Follow

WASHINGTON, March 11—With 200 concerns in Poland making small quantities of automobile parts and doing repair work, the country is patiently looking forward to the time when these organizations will be equipped to produce and assemble complete cars. It is one of Poland's great ambitions since the World War, the Automotive Division of the Department of Commerce is informed, to develop an automobile industry of its own.

There are no serious obstacles to the development of motor car manufacture in Poland. Practically all kinds of raw materials are produced in the country. Manufactured parts of all description are also made locally, including even solid tires. There are several concerns producing complete passenger and truck bodies. There are other concerns producing internal combustion engines for agricultural and industrial trial purposes. And yet, the creation of a plant to produce automobiles on a quantity basis is still to come.

The money shortage throughout the country is one of the deterring reasons. and the lack of skilled labor and of a competent staff of engineers, managers and superintendents is perhaps the chief other obstacle. A number of adverse conditions, such as bad roads, high prices of motor fuels, lack of a prosperous middle class, etc., have hampered the development of motor car transportation.

With its population of nearly 28 million people Poland possesses about 9300 motor cars of all descriptions. The annual sales may be estimated at 3000 cars including the Government requirements of about 500 cars a year. Since it is not likely that a Polish car could effectively compete with imported cars, especially the low-priced types, its share in the national automobile sales would doubtless be quite insignificant and would not warrant production on a really economical basis.

WISCONSIN CO. REORGANIZED

SAUK CITY, WIS., March 11—Earl McFarland, who founded the old Wisconsin Tractor & Manufacturing Co. here several years ago, has reorganized the business as the Wisconsin Tractor Co., with a capital stock of $25,000. A definite schedule of production has been put into effect, which is based on orders actually booked. An active sales campaign also has been undertaken, and prospects are reported to be exceptionally good, with the end of the agricultural depression that kept tractor production unusually restricted for the past four to five years.

Republic Brings Out New Three-Ton Truck

ALMA, MICH., March 11—The Republic Motor Truck Co. has brought out a three-ton capacity truck, called the Model 19, third series, which supplants the former model of the same number. The new vehicle is featured by improved appearance and more sturdy construction throughout.

The standard wheelbase has been increased from 154 to 165 in., with options of 156 and 185 in. available. Tire sizes have also been increased from 36 x 4 in. front and 36 x 8 in. rear to 36 x 5 in. and 36 x 10 in., respectively.

The radiator shell has been redesigned and the frontal area of the core has been increased about 60 sq. in. The polished aluminum top tank is surmounted by a heavy Republic shield, and a lower tank skirt has been added, which affords protection for the water outlet in cold weather.

A weatherproof cab of ample interior dimensions with large windows and small posts to give maximum vision is furnished with this model. The seat cushion is divided and the gasoline filler neck extends up between the two divisions, so that fuel may be taken on without removing the seat cushion. The tool compartment is located under the seat with a door opening out on the right side. Doors have sliding storm curtains and a sun visor is provided. The cab body has a spring mounting to relieve it of stresses set up by frame flexure.

The steering gear has been improved and is so mounted that it may be easily removed. The depth of the frame has been increased to give greater rigidity. The springs are heavier, long and wider and have larger eyes with replaceable bushings. A tie bar connects the frame side members at the rear spring rear brackets.

SEES BIG TRADE IN CUBA

AKRON, March 11—There is a wide field in Cuba for the sale of automobiles and rubber tires, according to Thomas F. Walsh, president of the Swinehart Tire & Rubber Co. of Akron, who returned last week from a trip to that country. Mr. Walsh was impressed, he said, with the growing prosperity and progressiveness of the people.

The streets of the cities and towns were crowded with automobiles, many of them expensive American cars, he observed, indicating that Cuba already has its problems of traffic congestion.

Thousands of cars will be sold in Cuba by American manufacturers, as a result of an extensive program of highway improvement being carried on by the government, Mr. Walsh said.

PLAN EQUIPMENT MART

CHICAGO, March 10—The Automotive Manufacturers Association plans to open its Automotive Equipment Mart about April 10, it is announced by President G. F. Disher. It will afford exhibition space for about 50 manufacturers.

New Method Adopted for Ford Payments

Buyers Not Required Now to Pay $5 Per Week—No Definite Sum Suggested

DETROIT, March 10—To extend the influence of its weekly payment plan in promoting ownership of Ford cars, the Ford Motor Co. is practically eliminating the $5 a week payment, which has been a feature since the plan was inaugurated. It is proposed now that the prospective buyer make the payments in whatever sum is most convenient. There is no definite payment suggested, the buyer being left to purchase the car as rapidly as his finances will permit.

The new method will be called the Ford Way, with no reference to any set payments. It is practically a straight savings proposition, with the saver, however, being enrolled as a prospective car buyer when he has brought his savings to the necessary amount.

In pursuance of this work, the company itself is engaging more directly in promulgating the savings method of buying cars. A separate department has been set up at the factory to carry on this work, and it will come directly under the factory sales department. This work will be carried out in complete cooperation with dealers, the actual sale being carried through by the dealer, as formerly, but the factory participating more directly in the enrolling work.

Quarter Billion Dollars Paid Ford Workers in 1924

DETROIT, March 11—More than a quarter of a billion dollars in wages and salaries were paid to the employees of the Ford Motor Co. during 1924, according to payroll totals made public here today.

The largest payrolls were at the Highland Park and River Rouge plants here, the total for these two plants alone reaching the enormous figure of $172,820,145 for the last year.

At other plants and branches throughout the country the company during the last year paid employees a total of $72,532,476. The figures given out also include wages and salaries paid at the Lincoln Motor Co., the C. E. Johansson Co., Inc., and the Fordson Coal Co., which totaled $8,648,906, bringing the grand total for the organization up to $253,001,528.

BUILDING CARS AT FRISCO

SAN FRANCISCO, March 10—Production of passenger cars has commenced at the recently completed factory of the Kleiber Motor Car Co. in this city. The new plant was opened officially by Mayor James Rolph, who "worked" on the first car turned out.

Federal Report Out on Gasoline Prices

Hitting Standard Oil, Trade Commission Recommends Restrictive Measures for Producers

WASHINGTON, March 11—Publication in the Congressional Record of a summary of the report made by the Federal Trade Commission on the question of the advance in gasoline prices during the last year was directed by the Senate on March 3 at the insistence of Senator Trammell of Florida. The information was made public by the Federal Trade Commission following the adoption of a resolution of Senator Trammell's demanding it be sent to the Senate "if not incompatible with the public interest."

The conclusions and recommendations of the report follow in part:

"That there has already been taken from the earth a large part of the total petroleum deposits of this country is generally agreed upon by geologists, who predict, moreover, an early exhaustion of this important natural resource if the present enormous rate of consumption is continued.

"The buying of crude oil, with the almost autocratic influence in dictating prices generally exercised by some particular large Standard Oil company in each great oil field of the country, is an abnormal condition, which appears as a survival in part of the monopolistic regime which prevailed before the decree dissolving the Standard Oil combination.

"In the sale of gasoline and kerosene a similar abnormal condition is found, namely, a situation in which some large Standard company in each region (except Oklahoma and Texas) ordinarily determines the price and smaller traders merely follow. This situation is the result of the method by which the business was territorially divided by the old Standard combination among 11 marketing companies.

"In view of the foregoing conditions in the industry the following recommendations are made, most of them being substantially repetitions of recommendations made in connection with previous inquiries:

Recommendations Made

(1) Application of the principle of the so-called "commodities clause" to pipe lines, as well as railroads, so as to prevent a pipeline company from being connected, directly or indirectly by holding company or otherwise, with a company which ships oil over its pipe line.

(2) Lower pipe-line transportation rates and the reduction of minimum shipment requirements from the prevailing rule of 100,000 barrels per shipment to a basis which will be reasonable for the small shipper.

(3) Prohibition by Federal legislation of common stock ownership or control in corporations which have been members of a combination dissolved under the Sherman law.

(4) Examination by the Department of Justice, in connection with its current inquiry into the results of the Standard Oil dissolution decree, of the present organization and activities of the large integrated members of the Standard Oil group.

(5) Consideration by Congress of the advisability of some restriction upon the exportation of crude petroleum and its products, in view of the rapid depletion of the petroleum resources of the country essential to national defense."

MORE TRAFFIC POLICE URGED AS SAFETY STEP

WASHINGTON, March 11—Enforcement of existing laws and regulations relating to the motor vehicle and the provision of adequate man power to handle traffic congestion, rather than a mass of new laws, was urged by the American Automobile Association today as the first step in a practical safety program.

The investigation made along these lines by the legislative board of the association brought out the former contention that the principal trouble today is the lack of vigorous inforcement of existing laws. It was found that in the past ten years the number of motor vehicles in the country increased practically 700 per cent, and 1000 and 1500 in some cities, while the traffic force in a great many instances stands at the same figure it stood at ten years ago, and in some cases is actually smaller.

839 New Planes Bought by Air Service Since 1920

WASHINGTON, March 11—Interesting statistics concerning the Air Service are contained in a letter transmitted by the Secretary of War to the Select Committee of the House Investigating the Air Service.

They show that during the five fiscal years, 1920 to the end of the last fiscal year 1924, the Air Service expenditures for planes of all types was 839 new planes purchased at a cost of $14,894,597.41 and an average cost of $17,750.

For remodeling war-produced planes an expenditure of $3,363,331.75 was made to remodel 1811 planes at an average cost of $1,850 per plane.

In addition, during these same years, for aircraft engines, the amount of $6,077,343.13 was spent to purchase 747 new engines, while $326,111.13 was spent to remodel 900 war-produced engines.

The total number of airplanes, both new and remodeled, procured during these years, as above, was, therefore, 2650, and the total cost of these planes, new and remodeled, was $17,856,929.16.

A total of 1592 planes were on hand by the Army Air Service at the end of the last completed fiscal year as follows: 471 training, 820 observation, 102 bombardment, 190 pursuit and nine attack.

Hupp Earnings $1.19 per Share in 1924

Financial Report Shows Net Profits $1,005,160; Previously Totaled $2,635,788

NEW YORK, March 10—For the year ended Dec. 31, 1924, the Hupp Motor Car Corp. reports net profits of $1,005,160, as compared with $2,635,788 in 1923. The profits last year were equal to $1.19 a share on the 571,131 shares of common stock outstanding, which have a par of $10.

Sales last year were $32,320,706, as compared with $38,013,014 in 1923. With the addition of "other income" of $428,687, and the deduction of expenses of $30,312,711 (compared with $34,746,427 in 1923) total income stood at $2,436,682, as against $3,663,865 in 1923. From total income deductions were made of $658,083 for interest and depreciation, $518,439 for development expenses, and $165,000 for Federal taxes. The deductions in 1923 were $628,077 for interest and depreciation and $400,000 for Federal taxes.

Common stock dividends amounting to $685,083, deducted from net income, left a surplus of $409,803, as compared with $2,039,816 the previous year.

The balance sheet shows a strong position in quick assets. Cash amounted to $1,403,972, as compared with $1,359,208 in 1923, and accounts receivable were $1,435,549, as against $941,653 in 1923. Inventories were comparatively low, aggregating $6,195,369, as against $8,170,770 a year ago. Plant and equipment, less depreciation, was placed at $8,508,329, as compared with $7,902,512 in 1923. The credit for good will, etc., was unchanged at $3,858,922. Total assets, with the inclusion of several smaller items, such as investments, Liberty bonds and deferred charges, were $21,730,761 as compared with $22,359,244 a year ago.

Liabilities included accounts payable of $1,938,142, as against $1,887,556 a year ago. Reserves for insurance, taxes, etc., were $539,181 ($677,954 in 1923), and reserves for Federal taxes $257,605, as compared with $479,912 a year ago.

KROHN OFF ON SALES TRIP

DETROIT, March 10—Henry Krohn, vice-president in charge of sales of Paige-Detroit Motor Car Co., is leaving on a trip to the Pacific Coast in the course of which he will hold dealer meetings at Los Angeles, San Francisco, Portland, Seattle and Spokane, returning to the factory in April. The Paige company in 1924 increased its Pacific Coast business by a substantial total and is looking for another high year in this territory.

The March manufacturing schedule at the factory is for approximately 5700 cars, the largest March's production that ever has been scheduled.

Men of the Industry and What They Are Doing

Harding Goes to Indianapolis

Sam V. Harding has been appointed general manager of the Indianapolis branch of the Nordyke and Marmon Co. He succeeds H. L. Peterson who becomes manager of the Philadelphia branch. Mr. Harding is an engineer who has been with the Marmon company for several years in sales and service positions.

Tucker Made Peerless Official

Charles A. Tucker has been named sales manager of the Peerless Motor Car Co. He was at one time Olds distributor for Nebraska, Iowa, Oklahoma and West Texas, and later became general sales manager of the Olds Motor Works.

Shelton Goes to Durant

H. H. Shelton formerly special regional representative of the Chevrolet Motor Co., has joined the organization of the Durant Motors, Inc., as special representative of the vice-president's office, with headquarters at 1819 Broadway, New York.

Hilton Leaves Wisconsin

Gabe Hilton, service manager of the Wisconsin Parts Co., Oshkosh, Wis., has resigned and is succeeded by W. A. Welch.

Doran Gets Chevrolet Post

Felix Doran, Jr., is in charge of the new zone wholesale office of the Chevrolet Motor Co. which is located in New Orleans. This office will serve the centers of Shreveport, Baton Rouge, Alexandria, and New Orleans in Louisiana, and Jackson and Vicksburg in Mississippi.

Canter Joins Ohio Fageol

O. M. Canter, comptroller of the Moline Plow and Tractor Co. for the past five years, has resigned to accept a similar position with the Ohio Fageol Motor Co. of Kent, Ohio.

Gray Officials Promoted

Ted F. Drews, for the past two years service manager of the Gray Motor Corp., has been named manager of purchases, succeeding L. E. Foster, who resigned. Previous to his connection with the Gray company Mr. Drews was with the Ford Motor Co., the Hupp Motor Car Corp., the R. C. H. Corp. and the A. B. C. Starter Co.

Announcement was made at the same time of the appointment of John W. Leggat, formerly service engineer, to the position of service manager. Mr. Leggat is at the present time conducting dealer educational meetings in Australia. He will take up his new duties immediately upon his return.

Charles Gould, director of Gray sales, has named J. L. Savage superintendent of service. Mr. Savage was formerly with the Canadian distributor for Gray cars.

Arnold Has New Connection

G. W. Arnold has been named assistant general manager of the Bridgeport Motor Truck Corp., Stratford, Conn. Previous to his new connection Mr. Arnold was an advertising representative of the Class Journal Co.

Larsen Joins Flint Forces

T. E. Larsen has been appointed manager of the Trenton Flint Co., New Jersey distributor for Flint and Locomobile cars. He was formerly connected with Paige and Chandler distributors in sales promotion work, and he has also served as new and used car manager.

Anibal Now Chief Engineer

B. H. Anibal has been named chief engineer of the Oakland Motor Car Co., succeeding Benjamin Jerome, who has resigned. Mr. Anibal is well known as the former chief engineer of the Cadillac Motor Car Co. and of the Peerless company. Since resigning from Peerless last year he has been employed as consultant of the Studebaker Corp. Mr. Anibal entered the automobile field in 1909, when he joined the engineering field of the Olds Motor Works.

Gilcrest Changes to Washington

E. H. Gilcrest, formerly general sales manager of the Westcott Motor Car Co. of Springfield, Ohio, has been appointed general manager of the Wardman Motor Car Co., a new distributing company at Washington, D. C.

Hendrickson with Belle City

R. O. Hendrickson has been appointed chief engineer of the Belle City Manufacturing Co., Racine, Wis. For ten years he was chief engineer of the J. I. Case Plow Works Co., builder of the Wallis tractor.

Norton Goes with Belle City

F. Lee Norton has been made vice-president of the Belle City Manufacturing Co., Racine, Wis. He retired in 1915 from the position of treasurer of the J. I. Case Threshing Machine Co. The Belle City company has recently purchased the Jackson Track Pull, a crawler attachment for Ford tractors.

Wilkerson with G. M. Export

Dan C. Wilkerson has recently accepted a position with the General Motors Export Corp. of New York. He was for many years identified with commercial engineering, advertising and sales promotion in Washington, D. C.

Taylor Leaves U. S. Steel

A. S. Taylor, formerly sales engineer of the United States Steel Corp., Canton, Ohio, is now with the Central Steel Co., Massillon, Ohio, in the same capacity.

Close Organizes New Concern

Lyman W. Close has resigned as chief engineer of the Bock Bearing Co., and with David R. Feemster, formerly assistant chief engineer of the same company, has formed a new organization to produce sheet metal stampings. The new company will be known as the Lyda Machine Products Co. and will be located in the Toledo Factories Building, Toledo, Ohio.

Barlow Assigned Oakland Territory

E. J. Barlow, formerly assistant manager of the Philadelphia branch of the Oakland Motor Car Co., has been promoted to the position of manager of the Indianapolis district. He has been a member of the Oakland organization for the past two years, coming from the John Deere Plow Co. His new territory includes the States of Indiana, Kentucky and part of Tennessee.

Oakland Promotes Voss

C. L. Voss has been made St. Louis district manager by the Oakland Motor Car Co. He was formerly assistant branch manager at Cleveland. His territory includes eastern Missouri and southern Illinois.

Cook Promoted

Mr. A. C. Cook was promoted from the position of general sales manager of the Warner & Swasey Co. to vice-president at the annual meeting of the company. Mr. Cook also becomes a member of the board of directors. Mr. Cook entered the employ of the company 24 years ago, has served as district manager of the New York territory and has represented this company abroad on three extended trips in Europe. The last ten years he has been general sales manager. At the same meeting the Warner & Swasey Co. presented Mr. E. P. Burrell, director of engineering, and Mr. William J. Burger, works manager, with gold watches.

Lynch Resigns from Fisher

Leigh Lynch, general manager of the Pontiac division of the Fisher Body Corp., has resigned, effective March 1. He will be succeeded by R. E. Brown, manager of the Beaudette division.

Congress Approves Brazil Highway Trip

Appropriates $15,000 for Expenses of Delegates to Pan-American Congress

WASHINGTON, March 11—Eleventh hour opposition of Congressman Blanton of Texas to the passage of a bill appropriating $15,000 to finance a trip of delegates, to be appointed by President Coolidge to the Pan-American Congress of Highways in Buenos Aires this year, was brushed aside on the eve of adjournment of the Sixty-eighth Congress, and the measure was enacted.

Congressman Temple of Pennsylvania, in supporting the measure, pointed out how the conference last year was financed by the automotive interests concerned, and that representatives of 19 South American countries came here and are expecting American delegates to return the visit this year.

Accentuating the importance of the automotive industry, Congressman Cramton of Michigan said: "The betterment of trade relations with South America is well worth $15,000, and whether one or two great industries are directly benefited thereby, all will share."

"If there is one thing we ought to do," said Congressman Linthicum of Maryland, "it is to assist South America in building highways, of which we have made such a success in this country. We are sending commercial attachés all over the world to build up business, and nothing can build up business better nor faster than to have good roads in the country. Of course, we will sell more automobiles, automobile parts that go with them, and that multiplicity of things for the comfort and convenience of motor travel."

In answering Congressman Blanton's opposition to the bill, Congressman Clancy of Michigan, its sponsor, said:

"This expenditure of $15,000 to send delegates to the Pan-American Congress is strongly urged by President Coolidge, by the Secretary of State, by the Secretary of Commerce and by the Secretary of Agriculture. The purpose is to build good roads in the 19 Latin-American republics—republics which cannot have much railroad mileage because of their lack of financial strength and because of the topography of the country.

KROHN MAKES COAST TRIP

DETROIT, March 10—Henry Krohn vice-president in charge of sales of Paige-Detroit Motor Car Co., has left on a trip to the Pacific Coast in the course of which he will hold dealer meetings at Los Angeles, San Francisco, Portland, Seattle and Spokane, returning to the factory in April.

The March manufacturing schedule at the factory is for approximately 5700 cars, the largest March production that has ever been scheduled.

Ford Will Move French Assembly Plant to Paris

PARIS, March 2 (*by mail*)—Ford intends at an early date to remove his Bordeaux assembly plant to the neighborhood of Paris, with a frontage on the River Seine, according to reports circulating here.

J. J. Harrington, the European manager of the Ford company, interviewed on this matter, stated that no definite action has yet been taken, but negotiations have been started and probably will be completed within ten days whereby the Ford company will secure land and factory buildings at Asnieres in the western suburbs of Paris.

With a water frontage and direct communication to the sea, this position will be excellent for the importation of parts, and it is also ideally placed for distribution. The new factory will be in the heart of the French automobile manufacturing district and in close proximity to such works as Citroen, Hotchkiss, Darracq, De Dion Bouton, etc. In accordance with a policy which the Ford company has pursued for several years, a greater portion of the car will be manufactured in France when the new factory is in operation.

REPUBLIC RECEIVERSHIP CLOSED

DETROIT, March 11—Security Trust Co. has closed its receivership of the Republic Truck Co. of Alma, Mich. The second and final payment of 6.084 per cent to priority creditors and 0.97107 per cent to general unsubordinated creditors has been made. On July 30, 1924, priority creditors received about 88 per cent and general unsubordinated creditors 14 per cent.

Nothing has been paid to subordinated creditors on their claims of $3,486,953, as by agreement their dividends have been added to those of the priority creditors.

Payments by receiver on unsecured claims of $4,861,741, including the $3,486,953 claim of subordinated creditors, total $727,686. A further small distribution of about $30,000 may be made if the Government allows a refund of that amount.

Security Trust Co. was appointed receiver for Republic Truck Sept. 28, 1922, operating the plant for several months and in May, 1923, selling the property to a committee of first mortgage gold noteholders representing about 85 per cent of the $2,500,000 issue. The committee organized a new company under Michigan laws, with the same name, and is continuing the business.

CAR SHORTAGE, WILLYS SAYS

TOLEDO, March 11—"The automobile industry is facing a shortage of motor cars this spring," was the opinion expressed today by John N. Willys, president of the Willys-Overland Co., after a survey of the dealer activities of this company and the general trend of buying in all parts of the country.

FINANCIAL NOTES

Eaton Axle and Pump Co., for the year ended Dec. 31, 1924, reports net earnings of $195,451, against $369,927 in 1923. The balance sheet as of Dec. 31, 1924, shows total assets and liabilities of $7,574,742, against $8,637,378 in 1923. Cash was $68,340, notes and accounts receivable $623,858 and inventories $391,249, against $91,451, $780,165 and $2,005,121, respectively, in 1923. Notes payable were $150,000, against none in 1923.

Marlin-Rockwell Corp. for 1924 shows gross sales of $3,839,877 and expenses of $3,425,872, leaving a balance of $414,005, against a loss of $318,648 in 1923. Net income, after all charges, available for dividends, was $321,205. This was equal, after preferred dividends, to $8.01 a share on the 222,805 common shares of no par value outstanding. In 1923, after all charges, the company reported a deficit of $1,659,938.

Reo Motor Car Co. reports the first six months of its fiscal year, dating from Sept. 1, as showing export shipments doubling the total for the same period a year ago.

Federal Motor Truck Co. as of Dec. 31, 1924, shows total assets and liabilities of $5,883,664, against $5,367,547 in 1923. Current assets were $3,360,114 and current liabilities $846,170, leaving a net working capital of $2,513,944, against $2,549,677 as of Dec. 31, 1923. Profit and loss surplus was $1,959,957, against $1,707,438 as of Dec. 31, 1923.

London General Omnibus Co., which controls over 4,500 buses operating in London, is paying 6 per cent on its common stock for 1924, as compared with 9 per cent for 1923 and 8½ per cent in 1922. More buses were in use last year. The average daily total of passengers carried was 3,250,000, or 1,158,411,377 in all.

Autocar Co. first convertible sinking fund 7s, due May 1, 1937, have been asked for by the Equitable Trust Co., New York, up until March 15, 1925, at an amount not exceeding 107½ and interest. The accepted bonds of those tendered are to be delivered not later than March 25, 1925.

Motor Wheel Corp. consolidated balance sheet as of Dec. 31, 1924, shows total assets and liabilities of $13,053,007, against $13,954,226 in 1923. Current assets were $5,491,740 and current liabilities $1,084,444, leaving a net working capital of $4,407,296, against $3,466,507 as of Dec. 31, 1923.

Yellow Cab Manufacturing Co. directors have declared three regular monthly dividends of 21 cents a share each, payable April 1 to stock of record March 20; May 1 to stock of record April 20 and June 1 to stock of record May 20, 1925.

Chicago Yellow Cab Co. directors have declared three regular monthly dividends of 33½ cents a share each, payable April 1 to stock of record March 20, May 1 to stock of record April 20 and June 1 to stock of record May 20.

Clarksburg Sheet Glass Co. of Clarksburg, W. Va., has been formed with a capital of $1,000,000 to consolidate the Clarksburg Glass Co. and the American Sheet Glass Co. Extensions and improvements are to be made.

Locomobile Co. of America, Inc., has ordered 2800 eight cylinder motors from Continental Motors Corp., to cover second quarter shipments for the Locomobile Junior Eight.

Youngstown Sheet and Tube Co. will build a seamless tube mill with a capacity for 100,000 tons annually, to be completed by the end of 1925 at an estimated cost of $2,000,000.

Viking Stock Co. stockholders, Cedar Rapids, Iowa, have increased the capital of the company to $500,000 from the original $200,000.

Anderson Aeroplane Corp. of America has announced plans for building at Hammonton, N. J., a plant for constructing airplanes costing from $400 to $2,000.

Ajax Rubber Co. 75,000 shares of capital stock, recently offered to stockholders, have all been sold.

Kelsey Wheel, Inc., has declared a cash dividend of $1.50, payable April 1 to common stockholders of record March 20.

U. S. Radiator Earns Over $30 Per Share

Report Shows 1924 Best Year in History—Net Earnings $1,521,476

DETROIT, March 11—Net earnings of United States Radiator Corp for the fiscal year ending Jan. 31 were $1,521,476.96, equivalent to $30.84 a share for common stock as against $29.22 a share in 1923, the best previous year. Gross earnings were $2,324,490.72 as against $2,275,300.99 in 1923. Net earnings in 1923 were $1,450,947.35. Dividends paid during the year totaled $407,672, leaving a surplus of $2,921,265.45 on Jan. 31, 1925.

Current assets of the company aggregate $5,276,932.99, comparing with $4,898,780.67 at the close of business in 1924. Current assets this year include cash 439,776.67; $1,491,529.61 in receivables, and inventory of $3,345,626.71. These compare with items of cash $385,518.20; receivables $1,395,642.14, and inventory of $3,117,620.33 in the year previous.

Working Capital Increased

Current liabilities were $491,349.03, the principal item being accounts payable of $486,054.55, this including Federal taxes. Current liabilities at the end of the previous year were $1,059,554.49, including $648,586.45 in accounts payable and $400,000 in notes payable which were retired in 1924. Ratio of current assets to liabilities is 10.7 to 1, an increase from a ratio 4 to 1. Net working capital stands at $4,785,583.96, an increase from $3,839,226.18.

Land, buildings, machinery and equipment, at depreciated book value show a total of $2,722,482.88, an increase from $2,531,201.96. Good will, patents and copyrights at $4,000,000 are the same as the year before. Other assets total $114,465.24 as against $89,817.39. Funded debt comprises $195,000 of first mortgage 6 per cent bonds put out in 1910 and reduced from $285,000 during the year, and $102,500 in unpaid balance on land contracts which amounted to $115,000 a year ago. Reserve for contingencies is $294,166.63 as against $143,085.04. The total of outstanding capital stock the surplus was $11,030,865.45. The total outstanding capital stock and surplus the year before was $9,917,160.49.

Directors Elected

Directors of the company were elected as follows: Henry T. Cole, George A. duCharme, Edward E. McNair, Sidney T. Miller, Fred T. Murphy, M. J. Murphy, Lewis H. Paddock, Robert J. Gross and J. Brooks Nichols. Officers elected are Henry T. Cole, president; Edward E. McNair, James F. McIntire, vice-presidents; William E. Mosher, secretary and treasurer, and James A. Venable, manager of the operating department.

New Board to Make Road Signs Uniform

WASHINGTON, March 11—An extremely important step toward the uniform numbering and marking of highways of interstate character was taken this week when Secretary of Agriculture Howard M. Gore appointed a board, composed of officials from the Bureau of Public Roads and the State highway departments, to prepare a plan and secure its adoption by the various States.

"This joint board," Secretary Gore points out, "will not only adopt uniform signs and danger signals to be approved by the States, but will also number the main highways throughout the country. The purpose of this is to simplify traveling directions for the public."

This board is being formed at the unanimous request of State highway departments who have been studying the question for several years. Thirty-eight State legislatures are now in session, and while a few States have no legislation on their statute books to provide for this coordinating work, a vast majority already have that authority, and it is expected that the remaining States will gladly fall in line.

New Law Would Permit Road Races in England

LONDON, March 2 (*by mail*)—A bill permitting motor races to be run on English roads has passed its first stage in the House of Commons. It is promoted by the Royal Automobile Club and is believed to overcome the objections raised against a similar measure that failed to secure Parliamentary approval last year.

Individuals or associations desiring to promote a car or motorcycle race will have to secure first of all the approval of the local authorities within whose jurisdiction the projected course will run. Next they must obtain the sanction of the Ministry of Transport, which will need to be satisfied that the roads to be closed during practice hours as well as for the actual race can be barred for the time being to the general public without "unreasonable inconvenience" being caused.

Further, in the event of the course passing through populous places, there will be "controls" in which the competing cars will not be allowed to exceed a very restricted speed. Other safeguards that are proposed to secure the safety of the public have been embodied in this new measure, and it is hoped to secure its early passage through both Houses of Parliament. But even if that hope is realized it is very doubtful whether there will be time to organize English road races this year.

FORD PAYS 57% OF CITY'S TAXES

DETROIT, March 11—The Ford Motor Co. paid 57 per cent of the taxes of the city of Highland Park this year. The plant was assessed at $104,500,000 and the tax was $2,500,000.

METAL MARKETS

The steel market is so accustomed to either feast or famine that a betwixt and between state of affairs, such as prevails at this time, is painted in as black colors as though shutdowns of mills were overhanging the industry. As a matter of fact, automotive commitments are on the increase, both numerically and quantitatively. Orders are being placed for second half of March and April shipment or at convenience of mill which means frequently shipment within a fortnight under present conditions. Sheet rollers are a little more dejected than producers of other descriptions of finished steel, if that were possible. Not only is there nothing left of the advances which were announced last November, but there is also evidence that here and there the prices which prevailed previous to November have been shaded.

The November and subsequent advances were purely gestures which could only become actual price increases if the volume of demand warranted it. Now they are discarded scraps of paper. As on previous occasions when developments interfered with price advances (scheduled to go into effect later) becoming operative on the day set, there are those who seriously question the wisdom of using deferred price advances as a means for bringing out orders at the old prices. Those who raise this point argue that this artificial stimulating of buying does not add a single ton to the volume of steel demand, but tends to bring about a temporary congestion of production facilities, invariably followed by so sharp a decline in the backlog that advantageous operating schedules become more and more difficult.

Producers of semi-finished steel are beginning to feel sharply the easing off in the sheet demand and find that non-integrated rollers are not at all responsive to offers of sheet bars at $39. This is only natural.

Pig Iron—With representative sales of No. 2 foundry iron on a $21, valley, basis, the market is attracting close buyers who are in the habit of taking advantage of such dips. Automotive foundries are not buying very heavily, but there is in evidence a modest broadening of individual buying, single car lot takers now inquiring for the best price on several hundred tons.

Aluminum—Somewhat better inquiry is reported from the automotive industries by importers. The leading interest is said to have on his books virtually a duplication of 1924 contracts at the same prices. The supply of secondary material continues light, and resmelters have little trouble in disposing at full prices of what metal they can obtain.

Copper—Important developments are lacking. Large inquiries from leading consumers have had no effect on the price which remains unaltered at 14¾c. delivered Connecticut Valley, or a fraction less. Connecticut brass mills are operating six days a week, and a good deal of their output is for automotive account.

Tin—The market is quiet and easy.

Lead—Storage battery makers are buying in a routine way and prompt metal does not go begging for buyers. The market is steady.

Zinc—Consumers' stocks are reported low and this imparts a firm undertone to the otherwise quiet market.

Calendar

SHOWS

March 7-14—Boston, Twenty-third Annual Automobile Show.

March 8-14—Vienna, Spring Fair.

April 1-17—Sydney, Australia, Royal Agricultural Show. Embraces automobile exhibits.

April 8-14—Bandoeng, Batavia, automobile show under auspices of Netherlands Indies Jaebeurs Fair Association.

April 22-May 7—Melbourne, Australia, International Automobile Show, under the auspices of the Chamber of Automotive Industries, in conjunction with the Royal Automobile Club of Victoria.

May 20-23—Detroit, Second Annual Automotive Maintenance Equipment Show, General Motors Building, conducted by the National Automobile Chamber of Commerce, with cooperation of the Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and the Automotive Manufacturers Association, Sam Miles, manager.

Sept. 21-26—London, Olympia Motorcycle Show.

Oct. 8-17—London, Olympia passenger car show.

Oct. 29-Nov. 7—London, annual truck show.

RACES

April 30—Fresno, Cal.

May 11—Charlotte, N. C.

May 30—Indianapolis.

June 13—Altoona, Pa.

June 20—Baltimore, Washington Speedway, Laurel, Md.

July 26—Paris, Montlhery Track, French Grand Prix.

Sept. 7—Altoona, Pa.

Sept. 30—Fresno, Cal.

Oct. 10—Baltimore-Washington Speedway, Laurel, Md.

Oct. 24—Charlotte, N. C.

Nov. 26—Los Angeles.

CONVENTIONS

May 20-23—Detroit, General Motors Building, National Automotive Service Convention conducted by the National Automobile Chamber of Commerce with the co-operation of Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and Automotive Manufacturers Association.

June 22-27—Summer convention of the Automotive Equipment Association at the Broadmoor Hotel, Colorado Springs, Colo.

S. A. E. MEETINGS

March 17—Buffalo Section, Automotive Air Brake Equipment, H. D. Hukill.

March 19—Detroit Section, Castings in Permanent Molds, Marc Stern and D. H. Meloche.

March 19—Metropolitan Section, Automotive Distributing, R. Sherman.

March 20—Chicago Section, Recent Progress in Various Fields of Automotive Engineering, H. L. Horning, John S. Erskine, and M. E. Chandler.

March 26—Minneapolis Section, Automotive Rail Car Engineering, S. E. Brennan and various railroad men of the twin cities.

March 26—San Francisco Group, Effects of Engine Operation on Lubricating Oils, L. Wagner.

March 27—Los Angeles Group, Air Cleaners, Prof. A. H. Hoffman.

April 7—Buffalo Section, Transportation Meeting.

April 9—Indiana Section, J. H. Hunt, Electrical Instruments for Automotive Research.

June 15-19—Summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.

To Make New Survey of U. S. Tire Stocks

WASHINGTON, D. C., March 11—A survey of the stocks of tires in the hands of dealers and manufacturers will be taken by the Rubber Division of the Department of Commerce as of April 1. This will be the third such survey to be taken. The Rubber Association of America conducted the first survey early last year but the second, in October, was taken over by the Department of Commerce which plans to repeat the work each year.

More than 100,000 questionnaires are now being prepared in Washington for mailing to dealers throughout the country. The responses will be carefully examined and the data compiled into totals by States. These questions will be asked:

1. All pneumatic automobile and truck casings on hand, including all sizes and all kinds of balloon and high pressure.
2. Automobile and truck inner tubes on hand, all sizes and kinds.
3. Solid and cushion tires on hand, all sizes and kinds.
4. Balloon tires for 20, 21 and 22 in. wheels on hand.
5. Do tires and tubes constitute the major portion of your sales?
6. How many makes of tires do you stock?
7. Do you vulcanize tires?
8. Do you sell automobiles? Accessories? Gasoline?

As a basis for computing the number of tires in manufacturers' warehouses and branches, the Rubber Division will use the statistics compiled by the Rubber Association of America. When these are considered along with the aggregate figures received from the tire dealers, the industry will have a clear picture of its total inventory in the light of which both production and distribution can be intelligently planned.

It is believed preliminary figures can be issued on April 18, and on or about May 1 a complete statement showing the average number of tires per dealer, the approximate number held in the United States and other data will be released. Individual dealer figures will not be published or revealed in any way.

SWEDISH DUTIES MAY CHANGE

WASHINGTON, March 11—A resolution has been presented in the lower chamber providing for a revision of the import duties on automobiles and parts of automobiles taken into Sweden for assembly, the Automotive Division is advised in a cable dispatch received from Trade Commissioner T. O. Klath at Stockholm.

At present, the dispatch concludes, the duties on parts and complete automobiles are about the same. So long as this condition exists it will prevent foreign interests from establishing assembly plants in Sweden. The advantages of having these assembly plants within the country would be increased employment for Swedish labor and a demand for Swedish raw materials.

CONTINENTAL AXLE GAINS

EDGERTON, WIS., March 11—The Continental Axle Co., affiliated with the Highway Trailer Co. and occupying joint works at Edgerton, Wis., reported an increase of 25 per cent in business to stockholders at the annual meeting. Four new products were added in 1924, namely, earth boring machines and power winches for the Western Electric Co., and steel wheels and springs for trailers. All officers were reelected, the personnel being practically identical with that of the Highway company.

Oakland to Produce More Closed Models

DETROIT, March 10—Announcing a closed car schedule for Oakland Motor Car Co. of 80 per cent for the first six months of the year, A. R. Glancy, president, declares that exact demand for closed versus open models during the present year is something that factory production executives can only estimate. The closed car schedule in the second half of the year depends upon the showing of the two types of models in the buying of the first half.

There is no question but that more than 50 per cent of all cars built during this year will be in the closed body type, said Mr. Glancy, but just what the proportion with each company will be will depend to a large extent on the prices at which their various models are listed and the general price class their lines occupy.

Gasoline Consumption Sets Record in January

WASHINGTON, March 10—Domestic consumption of gasoline in January, 1925, was the largest on record for that month, and was 20 per cent greater than in the corresponding month last year, it is shown by the Department of the Interior figures. The total was 599,784,560 gallons, representing a decline of 9.3 per cent from the December, 1924, figures.

Production also went on at a record rate during January, so that stocks on hand at the end of the month were increased by 150,000,000 gallons, there being 1,330,235,880 gallons at the refineries, about 10 per cent more than on Jan. 31, 1924. These stocks represent 68 days' supply at the January rate of demand.